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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

VOLUME III

JANUARY-JUNE, 1920

PUBLISHED MONTHLY UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, Inc.

BALTIMORE, U. S. A.
WILLIAMS & WILKINS COMPANY
1920

CONTENTS

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ENTRIES 1-161

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BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

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ENTRIES 1-161

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

1. GUYOT, CH. **Jurisprudence. [Legal affairs.]** Rev. Eaux et Forêts 57: 60-62. 1919.—The decree of November 26, 1918, regarding the application of the law of July 2, 1913, providing that private owners may voluntarily place their forest lands under management by the State, offers hope that the law will be administered in a liberal spirit, and that local forest officers will not be too bound down by rigid regulations. It is to be hoped that the amounts received from private owners to pay for the management of their lands by the State will be largely or entirely turned over to the local forest officers to recompense them for the additional work entailed by the law.—*S. T. Dana.*

2. DOÉ, FR. **La conversion en futaie et l'oïdium. [Conversion into high forest and the oïdium].** Rev. Eaux et Forêts 57: 53-59. 1919.—The fungus oïdium appeared in several departments of the Province of Champagne about 1907. Several species are affected but particularly oak. The spread of the disease is favored by humidity, especially in the spring when vegetation is starting. Young trees are most seriously affected, particularly coppice shoots of the current year. These are killed back year after year until they finally succumb. Seedlings, in spite of the theory as to their superior vigor, suffer equally if not worse. No remedy for the disease has yet been discovered.—This new enemy threatens to make the conversion of coppice stands into high forests, already sufficiently difficult, entirely impracticable. The advisability of this system of forest management, which has recently been in considerable favor in France, is also questioned by the author on other grounds. In his judgment if oak is to be grown at all in the region with which he is familiar, the system of coppice under standards will have to be used. Until sentiment on this point crystallizes he advises doing away with reproduction cuttings or making them as light as possible.—*S. T. Dana.*

3. X. **L'Administration des eaux et forêts pendant la guerre. [The administration of waters and forests during the war.]** Rev. Eaux et Forêts 57: 45-52. 1919.—At the outbreak of the war the bulk of the personnel attached to the Administration of Waters and Forests joined the various services in the army, leaving barely a sufficient force for the administration of the French forests. As the demands for wood for military purposes gradually but steadily increased, each service in the army proceeded to satisfy its own needs with no regard to the action being taken by other services or to the future of the forests. Seeing the danger to the forests in this method of exploitation, the Minister of Agriculture succeeded in securing the establishment of an Army Forest Service (Service forestier d'Armée) which exercised general supervision over all utilization of the forests within the zone occupied by the army. Back of the lines

in the interior of the country foresters were gradually attached to the various organizations using wood and finally a general committee on wood (Comité général des Bois) was established to coördinate and control all matters relating to the utilization of wood. The actual conduct of the necessary operations was centralized in a General Inspection of Woods (l'Inspection Générale des Bois).—As a result of the enormous demands for wood for military purposes, private forests suffered more severely than national and communal forests, which were protected by the Administration of Waters and Forests. In the Landes, which suffered from unusually intensive exploitations by the Allies of the French, a special Commission was created to exercise general supervision over all cuttings in this region.—One important outcome of the war has been the inauguration of a complete inventory of the available resources of the French forests. This work is being continued since the signing of the armistice, since the information being secured by it is essential to determine the extent to which the French forests can be used in the reconstruction period.—*S. T. Dana.*

4. Federal Horticultural Board. U. S. Dept. Agric. **Amendment No. 1 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements **60**: 21–22. 1919.—See Bot. Absts. 3, Entry 399.

5. Federal Horticultural Board. U. S. Dept. Agric. **Amendment No. 2 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements **61**: 33. 1919.—See Bot. Absts. 3, Entry 400.

6. Federal Horticultural Board. U. S. Dept. Agric. **Nursery stock, plant and seed quarantine. Notice of quarantine No. 37 with regulations.** Service and regulatory announcements **57**: 101–110. 1919.—See Bot. Absts. 3, Entry 401.

7. Detwiler, Samuel B. **Status of white pine blister rust control in 1918.** Rept. White Pine Blister Rust Control. Amer. Plant Pest Committee Bull. **2**: 4–11. 1919.—See Bot. Absts. 3, Entry 396.

8. Metcalf, Haven. **Summary of the white pine blister rust situation.** Rept. White Pine Blister Rust Control, Amer. Plant Pest Committee, Bull. **2**: 16. 1919.—See Bot. Absts. 3, Entry 411.

9. Boulger, G. S. [Rev. of: Webster, A. D. **Coniferous trees for profit and ornament: being a concise description of each species and variety, etc., etc.** *XX + 298 p., 28 plates.* Constable & Co. [Date not given.] [The title is very long, many of the chapter headings being included.] Jour. Bot. **57**: 102–103. 1919.

10. Marsh, C. D., A. B. Clawson, and H. Marsh. **Oak leaf poisoning of domestic animals.** U. S. Dept. Agric. Bull. 767. *36 p., 19 fig.* 1919.—At Salina, Utah, during summers 1915–1918 inclusive, experiments were conducted in feeding cattle with scrub oak (*Quercus gambelli*) *and at Monahans, Texas,* 1917, with "shinnery" oak (*Quercus havardi*). Marked symptoms are constipation, emaciation, hardened feces containing mucus and blood, and edema. The small losses, estimated between 2 and 3 per cent should not cause stockmen to overlook the fact that exclusive oak feed tends to injure cattle permanently and prevent normal weight gains. Exclusive oak brush diet can be eliminated by not admitting cattle to such ranges before grass has started growth; danger of oak poisoning is small when some other forage is present. A bibliography of the subject dating back to 1662 is appended.—*A. R. Bechtel.*

11. Anonymous. **The use of wood for fuel.** U. S. Dept. Agric. Bull. 753. *40 p., 5 pl.* 1919.—Abundant supplies of wood suitable for fuel are widely distributed over the United States, particularly the eastern half, and inability to secure coal should not result in suffering during the winter. By extending the present wide use of wood in rural districts, coal and cars can be saved for more essential uses. Wood can be substituted for coal with greatest public benefit in places where rail-hauled coal can be replaced with wagon-hauled wood. Long dis-

tance rail transportation of wood is not economical. Domestic consumers in rural districts and small cities can most easily substitute wood fuel for coal. Most types of stoves and furnaces can be adapted to the use of wood. Except in case of plants which use their own wood refuse, or others in the close vicinity of plants, wood fuel is less economical than coal for factories. When coal can not be had, wood can be used with fairly satisfactory results, and is cheaper than shutting down a plant. The widespread use of wood for fuel, if only such wood as is best fitted for the purpose be taken, will be of great benefit to our forests as well as a source of revenue to their owners. Organized effort by community, municipality or State organizations will be required to promote the general use of wood fuel. Such effort will have to stimulate the demand for wood and its production, as well as direct organization of the producing, the transporting, and the marketing of fuelwood. Where a possibility of fuel shortage exists, reserves of fuelwood should be established, preferably in the nature of municipal wood yards. The comparative fuel values, and their percentages in terms of short ton coal values, both for air dry and green condition, are presented for 135 species of American woods.—*C. H. Guise.*

12. LARSEN, J. A. **Comparison of seed testing sand and in the Jacobsen germinator.** Jour. Forest. 16: 690–695. Oct., 1918.—In an argumentative article, the merits of the Jacobsen germinator are set forth. It is pointed out that the sand tests are not uniform and that the only factor in the sand test which is not a variable is the sand itself, and in addition, this is the least important of the germinating factors. In the Jacobsen germinator, the external factors are controlled to a large degree. Moisture is regulated by the height of water in the tank, the size of the water wicks and the amount of air admitted. Heat can be controlled by the use of either gas or alcohol burners, or by hot water systems beneath the tank. Through two seasons tests of germination with species of *Larix, Pinus, Picea, Pseudotsuga, Tsuja* and *Thuja*, the germinator gave the much higher percentage of germination, and all except *Tsuga* a greater maximum rate and earlier beginning. It is claimed that by using the germinator, more uniform results are secured, the work can be duplicated and standardized, while in addition, the light, heat and moisture can be controlled and measured, and conditions in the tests observed at any time, the seed being removable at will. The germinator possesses the economic advantages of low initial cost and upkeep, and is adaptable to a variety of uses and conditions while at the same time being comparatively mobile.—Why the germinator should give the best results is largely a matter of conjecture and it would appear from the elimination of the other factors that it might be due to the water vapor, the greater heat energy moist air causing the very rapid germination.—*E. N. Munns.*

13. SMITH, FRANKLIN. **Pulpwood consumption and wood pulp production in 1917.** U. S. Dept. Agric. Bull. 758. *17 p. 1 fig.* 1919. A total consumption in 1917 of 5,480,075 cords of pulpwood was reported by 241 establishments, an increase of 251,517 cords or 5 per cent over the estimated total consumption in 1916. Spruce formed 56 per cent, hemlock 14 per cent and poplar 7 per cent of all pulpwood consumed. Yellow pine, tamarack, Douglas fir, basswood, white pine, beech, birch, chestnut, and maple were consumed in quantities considerably greater than during the previous year, but their use is confined to the regions to which these species are indigenous. Of the 5,480,075 cords converted, 28 per cent went into the production of ground wood pulp, 53 per cent into sulphite, 15 per cent into soda, and 4 per cent into sulphate. Spruce is about evenly reduced as between the mechanical and sulphite processes, while 89 per cent of hemlock is reduced by the sulphite process and 93 per cent of the poplar by the soda process. Average cost per cord of wood advanced from $8.76 per cord in 1916, to $11.10 per cord in 1917, f.o.b. mill, though individual costs range from $6.00 to as high as $25.00. Taking the states as a whole, approximately 54 per cent of pulpwood was transported under 150 miles, and another 35 per cent between 150 and 400 miles. In 1917, 1,031,934 cords of pulpwood were imported, at an average value of $8.30 per cord, an increase of 27 per cent over the cost of the previous year. Imported spruce and aspen formed 14 per cent of the quantity used in 1917 in comparison with 15 per cent of the year before. The production of wood pulp totaled 3,509,939 tons, an increase of 74,938 tons, or 2 per cent, over the 1916 reported total output. Of the total output, 1,535,953 tons, or 44 per cent, was manufactured by the

mechanical process, 1,451,757, or 41 per cent, by the sulphite process, 437,430, or 13 per cent, by the soda process and 84,799 or 2 per cent by the sulphate process. Selling prices f.o.b. mills averaged $43.33 per ton, an increase of $7.86, or 22 per cent, over the 1916 average. Imports were 1 per cent less than in 1916, though the average increase in price was from $42.02 in 1916 to $69.36 in 1917, an increase of 58 per cent.—*C. H. Guise.*

14. Smith, Franklin H., and Albert H. Pierson. **Production of lumber, lath, and shingles in 1917.** U. S. Dept. Agric. Bull. 768. 1–44. *Fig. 1–3.* 1919.—The quantity of lumber reported cut in 1917 by 16,420 mills was 33,192,911,000 board feet. This excludes the output of 2,652 mills, cutting less than 50,000 board feet each. There were reported 2,470 mills as being idle. The reported cut shows a decrease of 4.6 per cent from the 1916 figures, the number of mills reporting a decrease of 4.9 per cent, and the estimated total production, a decrease of 10 per cent. An increasingly larger per cent of the total production is being contributed by the bigger operations, 61.81 per cent of the total for 1917 being furnished by mills cutting over 10,000,000 feet annually. Tables showing all phases of sawmill operation and production are presented. For 32 of the most important commercial species, separate tables show the reported production in 1917. Yellow pine produces nearly 38 per cent of the aggregate cut of all woods, though this is a decrease of 10 per cent under the production of 1916. Douglas fir ranks second with 16 per cent, an increase of 3 per cent over the figures for 1916. Oak, white pine, hemlock and western yellow pine, each furnish about 6 per cent, all other species furnishing per cents considerably below this figure. The average value of lumber f.o.b. mills in 1917 was $20.32 per M feet board measure, the highest that it has ever been and 33 per cent higher than the 1916 figure of $15.32. Figures from Alaska, presented for the first time show that 43 mills cut 33,160,000 board feet, with an average value per M feet of $21.19.—*C. H. Guise.*

15. Badoux, H. **Ueber die durch die Kleine Fichten-Blattwespe (Nematus abietum) in den Waldungen der Schweiz verursachten schäden.** [Damage in Swiss forests caused by the small pine moth (*Nematus Abietum*)] Schweiz. Zeitschr. Forstwesen 70: 1–10. *1 pl., 10 fig.* 1919.—The life cycle of the pine moth (*Nematus abietum*) is known to be completed in one or more years. The cocoon stage is indefinite, depending on weather conditions. It is also shown to be a polyphag, since it was found to complete its life cycle on the native larch as well as on the pine.—The control measures are still in the experimental stage. Control by means of parasites, ants, birds, and spraying have been tried.—The attack of the larva is recorded by increment measurements which show that the growth is reduced to zero by serious attacks, and often the trees are killed.—Up to the present time the only remedy known is to avoid planting the species subject to attack. When any species is planted in localities out of its natural range, the unthrifty growth often leads to more serious trouble. Consequently, the policy followed is to plant only such species as are native in the region reforested.—*J. V. Hofmann.*

16. Fischer, Ed. **Ueber einige im botanischen Garten in Bern kultivierte Schlangenfichten.** [A cultivated snake fir in the Botanical Garden at Bern.] Schweiz. Zeitschr. Forstwesen 70: 10–13. *Fig. 1–2.* 1919.—A new form of fir (*Picea excelsa, Lk., lusus virgata Casp.* appeared in the Botanical Garden at Bern, noted by Chief Gardener Schenk. This form did not produce any latteral branches, and seed from the tree produced one seedling true to type. Other seedlings, which apparently assumed the same form, reverted to the branching habit when they were transplanted.—*J. V. Hofmann.*

17. Helbling, C. **Ist der Holzwert eines Walden als Gemeindevermögen den Fondsgeldern gleichzustellen?** [Should the stand of timber of a forest be considered the capital of the community?] Schweiz. Zeitschr. Forstwesen 70: 13–15. 1919.—Prior to 1917 timber valuation was not considered in land valuations in the Canton of St. Gallen. Other communities held that the timber valuation should be considered as the capital of the community. When the valuation of the timber is not considered it leads to either exploitation or interferes with the land exchanges desired by the community or the governnent. The remedy lies in a fair valuation of the timber in addition to the land value.—*J. V. Hofmann.*

GENETICS

George H. Shull, *Editor.*

18. Anonymous. Disease resistance in plants. Gard. Chron. 65: 192. Apr. 19, 1919.—See Bot. Absts. 3, Entry 586.

19. Baerthlein, K. Über bakterielle Variabilität insbesondere sogenannte Bakterienmutationen. [On bacterial variation, especially the so-called Bacteria mutations.] Centralbl. Bakt. 81: 369–475. 1918.

20. Baldensperger, Ph. J. Punics and parthenogenesis. Amer. Bee Jour. 58: 375–376. Nov., 1918.—Largely refutation of a former writer's assertions regarding merits of Punic bees. Punics and Syrians are unable to rear workers from a virgin.—*R. J. Garber.*

21. Broderick, F. W. Hardy apples and plums for the Canadian Northwest. Minnesota Hortic. 46: 393–399. *1 pl., 1 fig.* Nov., 1918.—Brief review of history of early fruit introductions with special stress on hardiness. Apple introductions from Russia, and crosses between standard varieties with hardy crab stock have given promising results. Russian seedling apples being tried. List and description given of several varieties of plums of *Prunus nigra* and *P. americana* which are entirely hardy and of fair quality. Hardy varieties can, perhaps, be developed by: first, plant breeding (crossing); second, selection from native stock; third, introduction from outside sources.—*E. L. Proebsting.*

22. Brown, N. E. The defertilization of flowers by insects. Gard. Chron. 63: 4. 1918.—See Bot. Absts. 3, Entry 604.

23. Bruce, J. L., Pedigree live-stock. Development of breeding in New Zealand. New Zealand Jour. Agric. 17: 65–70. Aug., 1918. Points out probable world-wide demand for pedigreed stock soon as transportion is available and shows New Zealand is well situated as distribution centre in Pacific. Emphasizes value of pedigreed stock and consistent use of pedigreed sires.—*H. K. Hayes.*

24. Burkholder, W. H. The production of an anthracnose-resistant white marrow bean. Phytopath. 8: 353–359. 1918.—Rev. by H. A. A. Van der Lek in Genetica 1: 156–157. Mar., 1919.—[See also Bot. Absts. 1, Entry 293.]

25. Castle, W. E. Siamese, an albinistic color variation in cats. Amer. Nat. 53: 265–268. May–June, 1919.—See Bot. Absts. 3, Entry 236.

26. Chamberlain, C. J. Chromosomes in Carex. (Rev. of: Heilborn, Otto. Zur Embryologie und Zytologie einiger Carex-Arten. [Embryology and cytology of several species of Carex.) Svensk Bot. Tidskr. 12: 212–220. *14 fig.* 1918. (See Bot. Absts. 1, Entry 1329; 3, Entry 38.)] Bot. Gaz. 67: 448. May, 1919.

27. Correns, C. Die Konkurrenz der mänlichen und die weiblichen Keimzellen und das Zahlenverhältnis der beiden Geschlechter. [The concurrence of male and female germ cells and the numerical relations of the two sexes.] Die Naturwiss. 6: 277–280. 1918.

28. Crandall, C. S. Apple bud selection: Apple seedlings from selected trees. Illinois Agric. Exp. Sta. Bull. 211: 181–264. *43 fig.* 1918.—See Bot, Absts. 3, Entry 242.

29. Cutler, G. H. A dwarf wheat. Jour. Amer. Soc. Agron. 11: 76–78. 1919.—See Bot. Absts. 3, Entry 171.

30. Dahlgren, K. V. O. Coloration of plants as affected by crossing varieties. Svensk. Bot. Tidskr. 12: 103–110. *3 fig.* 1918.

31. Danforth, C. H. **The developmental relations of brachydactyly in the domestic fowl.** Amer. Jour. Anat. 25: 97–116. *5 fig.* Mar. 15, 1919.—Writer finds close correlation between booting of shanks and brachydactyly (reduction in size and number of bones in fourth, and sometimes third toe) in at least certain strains of fowls, and probably also pigeons. A rooster which was heterozygous in dominant characters, booting, brachydactyly, polydactyly and broad comb (walnut) was crossed with white Leghorn hens of strain in which these traits had been wholly absent. Polydactyly and broad comb (walnut or rose) segregated out, among the chicks, independently of each other and of booted shanks and brachydactyly. The latter two characters, however, were almost perfectly correlated. The fact that there was correlation in degrees of booting and brachydactyly as well as in their mere presence, is taken to indicate that relation is physiological rather than one of genetic linkage. A study of the embryology revealed that brachydactyly could often be recognized at the ninth day of incubation, before the laying down of all of the cartilages of the phalanges (tenth day) and before the appearance of down rudiments (eleventh day). Author considers that neither condition can be a direct cause of the other but that there is some common factor. He suggests that study of the early functioning of endocrine glands might throw some light on the question.—*Sewall Wright.*

32. Davenport, C. B. **Annual report of the Director of the Department of Experimental Evolution and of the Eugenics Record Office.** Carnegie Inst. Washington Year Book 17 (1918): 103–126. 1919.—Many of staff and assistants have been in war work but special effort has been made to maintain breeding strains.—Riddle experimented on pigeons with drugs urotropin and quinine to note effects on development and sex; results not given. Analysis of brains of supposedly ataxic pigeons showed them "chemically undifferentiated or juvenile;" this line of work may throw light on chemistry of hereditary mental diseases.—Banta reports finding sex intergrades in additional lines of *Daphnia longispina*; selection within sex intergrade strains to produce more normal females or more decidedly sex-intergrading ones proved fairly effective. Banta discusses earlier evidence pointing to causal effects of environment on appearance of males or on shifting of degree of sex intergrades.—Metz reports discovery of several new mutant characters in *Drosophila virilis* and their linkage relations. Further analysis of sex-linked characters in *Drosophila virilis* continue to show correspondence with sex chromosome condition in *D. ampelophila.*—MacDowell's experiments show that rats of non-alcoholic parentage are superior to offspring of alcoholic as revealed by memory and association tests. Second generation of alcoholized rats average less than normals in weight, and number of litters is scarcely half number born to normals.—Blakeslee's investigations mostly in adzuki beans (*Phaseolus radiatus*) primarily a practical problem but some study of seed-color may be of theoretic interest; 40 new lines of adzuki beans were introduced into his cultures; a unifoliolate mutation occurred in one inbred line; chemical properties of beans and dietary characteristics are being investigated by specialists. Dwarf *Portulaca* is a simple recessive, and normal branch sports proved heterozygous, giving 3 normals : 1 dwarf. In *Datura* globe mutant selfed or used as female parent with normal gives about 3 normals to 1 globe, while normals × globes gives about 38 normals to 1 globe; mutant complex is only slightly transmitted through pollen; no pure race of globes is yet obtained. Weeping habit in mulberry is a simple Mendelian recessive.—Harris investigated dry weight and water content of seedling leaves of beans showing structural variation and found physiological differences accompanying structural variations. Harris made studies in pure statistical theory, and on variation and correlation in inflorescences of *Spirea*, sporophylls of *Ficaria*, depauperization of ascendants in relation to descendants in beans, vegetative characters in relation to fruit characters; biometrical aspects of plot-testing and of egg-production.—A review is given of work of past eight years of Eugenics Record Office, lately taken over by Carnegie Institution; it has become repository for pedigrees of better families and of those in custodial institutions; it has accumulated a large index of separate inborn characteristics of American families; it has trained field workers and maintained a field force which has gathered eugenical data on "Ishmael" tribe of Indiana, Amish sect, the "Nams" and "Jukes;" on color in albinos, and in negro-white crosses; diseases of chorea and pellagra; consanguinity; Indian hybrids, human stature, and hare lip; it has coöperated with other institutions, and advised on eugenical fitness of proposed marriages.—*J. P. Kelly.*

33. GUTHERZ, S. **Zur Lehre vom Ursprung der tierischen Keimzellen. [To the doctrine of the origin of the animal germ cells.]** Arch. Mikroskop. Anat. 92^2: 1-10. *2 pl., 1 fig.* 1918. —Author finds mitoses among oögonia of *Diestrammena marmarata* (Locustidae), and conclude that oöcytes do not arise, as Vejdovsky had assumed, directly from cells of terminal filament of ovary without intervening oogonial stage. Also concludes that germ cells of this form are distinct from and wholly independent of terminal filaments or epithelium.—Well defined oögonia, of indefinite number of cell generations, are demonstrated in domestic cat. Observations lead to conclusion that primary genital cells of cat ("sex cells" of Nussbaum) may either become oögonia directly, or become indifferent epithelial cells which are then capable of becoming oögonia. Shows that absolute genetic distinction of germ and follicle cells, postulated by Rubaschkin, is not universal.—Work is regarded as qualified confirmation of Nussbaum's theory of origin of germ cells.—*A. Franklin Shull.*

34. HALL, PRESCOTT F. **Immigration restriction and world eugenics.** Jour. Heredity **10**: 125–127. Mar., 1919.—See Bot. Absts. 3, Entry 1001.

35. HARLAND, S. C. **The improvement of the yield of Sea Island cotton in the West Indies by the isolation of pure strains.** West Indian Bull. 17: 145–161. 1919.—Yield is dependent on many factors, both morphological and physiological. Selection must aim to obtain type with high yielding ability for certain environmental conditions.—Self fertilized seed of individual plants was used for selection studies. Types were isolated with higher mean values for number of ovules and seeds per loculus, number of loculi per boll, weight of lint per 100 seeds and average seed size. Small-seeded strains were as vigorous as larger-seeded sorts, but large seeds are desirable because of greater potential lint-bearing surface. One strain, when compared with ordinary Sea Island cotton, gave increase in weight of lint per boll, of 31 per cent.—*H. K. Hayes.*

36. HARLAND, S. C. **The inheritance of immunity to leaf-blister mite (Eriophyes gossypii, Banks) in cotton.** West Indian Bull. 17 : 162–166. 1919.—Two varieties of cotton used. Immune St. Vincent crossed with susceptible Southern Cross Upland gave intermediates in F_1 inclining toward susceptible parent. Segregation occurred in F_2 while in F_3 immune bred true and non-immune again segregated. Author briefly summarizes his former breeding investigations anent immunity to *Eriophyes gossypii.*—*R. J. Garber.*

37. HAYES, H. K., and E. C. STAKMAN. **Rust resistance in timothy.** Jour. Amer. Soc. Agron. **11**: 67–70. 1919.—See Bot. Absts. 3, Entry 107.

38. HEILBORN, OTTO. **Zur Embryologie und Zytologie einiger Carex-Arten. [Embryology and cytology of several species of Carex.]** Svensk Bot. Tidskr. **12**: 212–220. *14 fig.* 1918. [Through review by C. J. Chamberlain. Bot. Gaz. **67**: 448. May, 1919.]—Oogenesis and spermatogenesis have been studied in several species of *Carex*, special attention being given to chromosome numbers, which vary greatly in this genus. The gametophyte numbers in the forms investigated are as follows: *Carex pilulifera* 8, *C. ericetorum* 16, *C. digitata* 24, *C. caryophylla* and *C. flava* 32. Juel had already reported 52 for *C. acuta*, and Stout 37 for *C. aquatilis*. *C. pilulifera* has the largest chromosomes, and in species with higher numbers the chromosomes are correspondingly smaller. Attempts to cross the various species have not yet proved successful, but the work is still in progress. See Bot. Absts. 1, Entry 1329.—*G. H. Shull.*

39. HERWERDEN, M. A. VAN. **Over eenige nieuwe opvattingen in de celleer. [On several new discoveries in cytology.]** Genetica **1**: 130–133. Mar., 1919.

40. HUMBERT, J. G. **Tomato diseases in Ohio.** Ohio Agric. Exp. Sta. Bull. 321: 157–196. *12 fig.* 1918.—See Bot. Absts. 2, Entry 767.

41. Hutcheson, T. B., and T. K. Wolfe. **Relation between yield and ear characters in corn.** Jour. Amer. Soc. Agron. **10**: 250–255. Sept., 1918.—Authors find correlation between yield and many points emphasized on the score card. Yield is positively related to length, average circumference, both of ear and cob, uniformity of exhibit, shape of ears and trueness to type, character of tips, uniformity of kernels, shape of kernels, and size of germ.—Ears of Boone County White for planting were selected at random. Correlations as obtained are based on comparison for seasons 1916 and 1917, of 10 or 12 high- versus 10 or 12 low-yielding strains.—*R. J. Garber.*

42. Jaffé, H. [Rev. of: Dresel, K. **Inwiefern gelten die Mendelschen Vererbungsgesetze in der menschlichen Pathologie? (To what extent do Mendelian laws of heredity hold in human pathology?)** Virchows Arch. **224**: *256 p.* 19—] Zentralbl. Physiol. **33**: 286–287. 1918.

43. Johnson, James, and R. H. Milton. **Strains of white Burley tobacco resistant to root rot.** U. S. Dept. Agric. Bull. 765. *11 p., 4 fig.* April 18, 1919.—A semi-popular discussion of the results obtained in Kentucky from the use of strains of White Burley tobacco (*Nicotiana tabacum*) resistant to the root-rot disease (*Thielavia basicola*). The tests carried on for three years in Kentucky have shown that greatly increased yields can be obtained on infested soils by the use of resistant strains. The quality of these strains does not seem to be inferior to the ordinary strains grown. The importance of the disease is discussed and resistant strains recommended where growers suspect the disease to be present. It is pointed out that the well established practice of growing only two crops of tobacco in succession in the Burley district as compared with continuous culture in some other sections where other varieties are used has come about largely as a result of the extreme susceptibility of the White Burley variety to the root-rot disease. [See Bot. Absts. 3, Entry 403.[—*L. R. Jones.*

44. Johnson, Roswell H. **The determination of disputed parentage as a factor in reducing infant mortality.** Jour. Heredity **10**: 121–124. Mar., 1919.—See Bot. Absts. 3, Entry 1006.

45. Kuiper, K. [Rev. of: Haecker, Valentin. **Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. [Embryological analysis of characters (Phaenogenetics). General results of embryology, genetics and eugenics.]** *8 vo, 344 p., 181 fig.* G. Fischer: Jena, 1918.] Genetica **1**: 164–170. Mar., 1919.—See also Bot. Absts. 1, Entry 1216.

46. Lehmann, Ernst. **Über reziproke Bastarde zwischen Epilobium roseum und parviflorum. [Reciprocal hybrids between Epilobium roseum and parviflorum.** Zeitschr. Bot. **10**: 497–511. *7 fig.* 1918.—See Bot. Absts. 3, Entry 266.

47. Lehmann, Ernst. **Über neuere Oenothera-arbeiten. [Recent works on Oenothera.]** Zeitschr. Bot. **10**: 517–551. 1918.

48. Lehmann, Ernst. [Rev. of: Stout, A. B. **Fertility in Cichorium Intybus: Self-compatibility and self-incompatibility among the offspring o self-fertile lines of descent.** Jour. Genetics **7**: 71–103. Feb., 1918. (See also Bot. Absts., 1, Entry 243.)] Zeitschr. Bot. **10**: 551–552. 1918.

49. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. **11**: 143–162. *2 fig.* 1919.

50. Lippincott, William A. **The breed in poultry, and pure breeding.** Jour. Heredity **10**: 71–79. *Fig. 10–16.* Feb., 1919.—See Bot. Absts. 3, Entry 1011.

51. Lombarteix, Jean Marie. **Les semis comme moyen de combattre la dégénérescence de la pomme de terre. [Seeds as means of combatting degeneration in the potato.]** Rev. Hortic. **90**: 170. Oct., 1918.—See Bot. Absts. 3, Entry 645.

52. Lotsy, J. P., met medewerking van H. N. Kooiman en M. A. J. Goedewaagen. De Oenotheras als kernchimeres. [The Oenotheras considered as nuclear chimeras.] Genetica 1: 7–69, 113–129. Jan.–Mar., 1919.—First of a series which Lotsy hopes to publish under collective title "Proeven en beschouwingen over evolutie," ["Experiments and considerations on evolution."] The hypotheses with which he works precedes.—Contents of first article are as follows: All *Oenotheras* produce mostly gametes of same kind as those out of which they have been built up themselves; in other words passing through thousands of divisions and even the reduction division the original gametes are supposed to keep intact their individuality and to lie near each other in diploid phase independently like the composing tissues of, e.g., a *Solanum* chimera. Following the system of Renner author has given names to the different gametes with which his experiments are concerned. Most of the so-called *Oenothera* species, if not all, produce principally two kinds of gametes and are themselves the result of union of two different gametes. Therefore, Lotsy summarises that all *Oenotheras* with which Renner and he himself have worked are neither species nor hybrids, but nuclear chimeras. There is a certain restriction to be made: Author remarks that absolute nuclear chimeras do not exist since gametes will influence each other now and then in some degree. Of the more important inter-influences Lotsy mentions that the plurichromosomal mutants come into being when one of the chromosome complexes takes one or more chromosomes of the other in the reduction divisions. Exchange of chromosomes, or even of qualities, gives rise to aequichromosomal mutants. When these exchanges are seldom they result in the mutations of de Vries, and when they are frequent, to mass mutations.—In last chapter author treats problems of the gene and develops following hypothesis: Chromosomes cause characters and there are as many groups of characters as there are chromosomes. It is therefore superfluous to assume existence of independent genes; mere chance distribution of the chromosomes will explain normal Mendelian segregations. Problem of duplicate factors is solved when we accept that chromosome causing a special characteristic is represented more than once in one of the gametes of the individuals crossed *inter se*, instead of assuming that different genes have similar effects. Series of gametes present themselves forming reduplication series but these have nothing to do with real reduplication, coupling or repulsion. The data which remains unsolved are those of real coupling and repulsion, as chiefly given by the school of Bateson and of Morgan.—Briefly formulated Lotsy's hypothesis of the nuclear chimeras involves *a coupling of chromosomes* more or less extensive.—*H. N. Kooiman.*

53. Love, H. H., and W. T. Craig. The synthetic production of wild wheat forms. Jour. Heredity 10: 51–64. *9 fig.* Feb., 1919.—See Bot. Absts. 3, Entry 1012.

54. MacCaughey, Vaughan. Race mixture in Hawaii. Jour. Heredity 10: 90–95. Feb., 1919.—See Bot. Absts. 3, Entry 1013.

55. Magnusson, H. Geschlechtslose Zwillinge. Eine gewöhnliche Form von Hermaphroditismus beim Rinde. [Sexless twins. A usual form of hermaphroditism in cattle.] Archiv Anat. Physiol. 1918: 29–62. *3 pl., 8 fig.* 1918.—See Bot. Absts. 3, Entry 1014.

56. Matouschek. [Rev. of: Vogtherr, Karl. Über die theoretischen Grundlagen des Variabilitäts- und Deszendenz-problems. (On the theoretical foundations of the variability and descendence problems.) Zeitschr. indukt. Abstamm. Vererb. 19: 39–72. Mar., 1918.] Zentralbl. Physiol. 33: 287–288. 1918.

57. Miyazawa, B. Studies of inheritance in the Japanese Convolvulus. Jour. Genetics 8: 59–82. *Pl. 2, 1 fig.* Dec., 1918.—Original material for experiments was of two types:—A, leaf yellow (chlorina) and flower white with throat tinged magenta; B, leaf green and flower dark red. F_1 plants from reciprocal crosses between these types had green leaves and light magenta ("red") flowers with white margins, latter factor supposed to have been borne by white parent. F_2, F_3, F_4, progenies and back-crosses between F_1 plants and parent types gave further data supporting theory that green leaf color is dominant to yellow, and white margin of corolla to full color, and colored flowers to white, all allelomorphic characters segregating

in F_2 in 3:1 ratios. No homozygous green plants with "red" flowers were found. In offspring derived from green plants with red flowers leaf color always segregated into green and yellow, while segregation of flower color gave "reds" to dark reds as 2:1. Author assumes that in presence of a gene *D*, flower is dark red or some other color according as green factor *G* is in either homo- or heterozygous condition (or absent). F_1 hybrids (*GgDd*) thus always bear flowers of red (=magenta) color.—*E. E. Barker.*

58. Molz. **Über die Züchtung widerstandsfähiger Rebsorten. [On the breeding of resistant varieties of grapes].** Jahrb. Deutsch. Landswirts. Ges. **33**: 166–204. 1918.

59. Moore, Carl R. **On the physiological properties of the gonads as controllers of somatic and psychical characteristics. I. The rat.** Jour. Exp. Zool. **28**: 137–160. *5 fig.* May 20, 1919.

60. Murbeck, Sv. **En säregen blomanomali hos Capsella bursa-pastoris. [Abnormal flowers in Capsella bursa-pastoris.]** Ark. Bot. **15**[12]: 1–8. *1 fig.* July 25, 1918.—See Bot. Absts. 3, Entry 274.

61. Remlinger, P. **Contribution a l'étude de l'immunité héréditaire contre la rage. [Contribution to the study of hereditary immunity against rabies.]** Compt. Rend. Soc. Biol. Paris **82**: 141–144. 1919.—Rabbits whose parents either were naturally immune to rabies or had been inoculated were subjected to one, two, three, or four inoculations in muscles of neck or under dura mater. Others from parents not immune were similarly treated. Rate of mortality was only slightly lower among children of immune parents than among controls, indicating little or no inheritance of immunity.—*A. Franklin Shull.*

62. Renner, O. **Oenothera Lamarckiana und die Mutations-theorie. [Oenothera Lamarckiana and the mutation theory.]** Die Naturwiss. **1918**: 1–25. 1918.

63. Renner, O. **Weitere Vererbungsstudien an Oenotheren. [Further genetical studies on Oenotheras.]** Flora **11, 12** (Festschr. Stahl) : 641–667. 1918.

64. Roberts, H. F. **Quantitative character-measurements in color crosses.** Science **49**: 516–517. May 30, 1919.

65. Roberts, Herbert F. **The founders of the art of breeding.** Jour. Heredity **10**: 99–106. *4 fig.* Mar., 1919.

66. Rosenberg, Otto. **Chromosomenzahlen und Chromosomendimensionen in der Gattung Crepis. [Chromosome number and chromosome dimensions in the genus Crepis.]** Ark. Bot. **15**[11] : 1–16. *6 fig.* 1918.

67. Rümker, K. von. **Die Züchtung der Ölpflanzen. [The breeding of oil-plants.]** Jahrb. Deutsch. Landwirts. Ges. **33**: 150–158. 1918.

68. Russell, E. S. [Rev. of: H. F. Osborn. **Origin of single characters as observed in fossil and living animals and plants. (Origine de caractères particuliers, telle qu'on l'observe chez les animaux et les plantes fossiles et vivants).** Amer. Nat. **49**: 193–240. *10 fig.* 1915.] Scientia **25**: 323–325. 1919.

69. Sakamura, Tetsu. **Kurze Mitteilung über die Chromosomenzahlen und die Verwandtschaftsverhältnisse der Triticum-Arten. [Brief contribution on the chromosome numbers and the relationships of Triticum species.]** Bot. Mag. Tokyô **32**: 151–154. 1918.

70. Schouten, S. L. [Rev. of: Pascher, A. **Studien über die rhizopodiale Entwicklung der Flagellaten. [Studies on the rhizopodial development of Flagellates.]** Arch. Protistenkunde **36**: 81–136. 1916.] Genetica **1**: 205–206. Mar., 1919.

71. TOOLE, WM., SR. Plant improvement by selection. Minnesota Hortic. 46: 368–372. Oct., 1918.—Number of examples cited of new or improved flowers and vegetables obtained by selection. Method advocated is selection of stock approaching ideal type, separate culture of progeny of each individual and discard of populations containing fewest desirable plants. Improvements in certain native flowers suggested.—*E. L. Proebsting.*

72. VAN DER LEK, H. A. A. [Rev. of: BURKHOLDER, W. H. The production of an anthracnose-resistant White Marrow bean. Phytopath. 8: 353–359. 1918. (See also Bot. Absts. 1, Entry 293.)] Genetica 1: 153–156. Mar., 1919.

73. VAN DER LEK, H. A. A. [Rev. of: MOLZ, E. Ueber die Züchtung widerstandsfahiger Sorten unserer Kulturpflanzen. (On the breeding of resistant varieties of our cultivated plants). Zeitschr. Pflanzenzücht. 5: 121–124. *Fig. 17–22,* 1917.] Genetica 1: 192–202. Mar., 1919.

74. VAN FLEET, W. New everbearing strawberries. Jour. Heredity 10: 14–16. *Fig. 7–8.* Jan., 1919.—Author mentions popularity of everbearing berries and gives brief description of investigations to improve quality and runner production of present sorts. All are descendants of Pan American, sport of Bismark, *Fragaria virginiana.* Mexican and European Alpine forms, *F. vesca,* are everbearing but inferior.—Seed importations of *F. vesca* from Mexico in 1914, tried at Rockville, Maryland, and Chico, California, gave certain hardy everbearing plants which produced vigorous runners. Berries were small, well flavored, of little commercial value. Crosses with these and certain commercial spring-bearing sorts gave 400 plants of high merit though none were everbearing. Cross between these seedlings and 33,005 gave 150 seedlings of which 4 were everbearing, bore handsome, large berries equal to best commercial everbearing sorts and produced vigorous runners.—[See Bot. Absts, 2, Entry 732.]—*J. H. Beaumont.*

75. VAN FLEET, W. New pillar rose. Jour. Heredity 10: 136–138. *Fig. 18–19.* Mar., 1919.—See Bot. Absts. 3, Entry 1042.

76. WARBURTON, C. W. The occurrence of dwarfness in oats. Jour. Amer. Soc. Agron. 11: 72–76. *Fig. 1–2.* 1919.—See Bot. Absts. 3, Entry 176.

77. WOODS, FREDERICK ADAMS. Good qualities are correlated. Jour. Heredity 10: 84–86. Feb., 1919.—See Bot. Absts. 3, Entry 1047.

HORTICULTURE

J. H. GOURLEY, *Editor*

78. CHANEY, A. W. Advertising and control of distribution. Proc. Ann. Meet. Amer. Cranberry Growers' Assoc. 49: 21–26. *Pl. 1.* 1919.—This is an address by the General Manager of the American Cranberry Exchange concerning the efforts of the Exchange in marketing the crops of the three cranberry growing states. Prices have varied from $2.50 to $25 per barrel during the period 1906–1919. The efforts of the Exchange in distributing and advertising the crop have brought to the growers a gain of about one million dollars.—*J. K. Shaw.*

79. CONRADI, A. F., AND H. W. BARRE. Orchard spraying. South Carolina Agric. Exp. Sta. Ext. Circ. 17. *8 p.* 1919.

80. DANIEL, LUCIEN. Cultures maraîchères expérimentales au bord de la mer. [Market gardening experiments on the sea coast]. Compt. Rend. Acad. Sci. Paris 168: 116–118. 1919.—Experiments were carried out to determine methods of conserving the water in the sandy soils of dunes along the sea coast. Lettuce, chicory and certain other similar plants were grown (a) under natural conditions, (b) using buried *Sphagnum* to hold the water, and (c) using well rotted cow manure buried in the same way as the *Sphagnum.* It was found that

under conditions of drought the buried *Sphagnum* conserves the moisture and keeps the plants in better condition than manure or natural soil. The use of *Sphagnum* appears to bring about a xerophytic structure in plants, probably due to the lowering effect on the temperature of the soil around their roots.—*V. H. Young.*

81. Gale, H. V. **Grafting the grape vine.** Agric. Jour. India **14**: 116–121. *Pl. 1.* 1919. —From the experiments cited, it appears that grafting the grape vine increases fruitfulness, the grafts give larger and closely set bunches. The quality of fruit was not changed appreciably. —*J. J. Skinner.*

82. Hutchinson, J. **Primula chasmophila.** Curtis Bot. Mag. **15**: *Pl. 8791* (*colored*). 1919.—See Bot. Absts. 3, Entry 150.

83. Hutchinson, J. **Primula tibetica.** Curtis Bot. Mag. **15**: *Pl. 8796* (*colored*). 1919.—To be abstracted later.

84. Hutchinson, J. **Rhododendron auriculatum.** Curtis Bot. Mag. **15**: *Pl. 8786* (*colored*). 1919.—To be abstracted later.

85. Hutchinson, J. **Rhododendron callimorphum.** Curtis Bot. Mag. **15**: *Pl. 8789* (*colored*). 1919.—To be abstracted later.

86. Skan, S. A. **Ipomoea dasysperma.** Curtis Bot. Mag. **15**: *Pl. 8788* (*colored*). 1919.—To be abstracted later.

87. Staff, Otto. **Protea longifolia.** Curtis Bot. Mag. **15**: *Pl. 8993* (*colored*). 1919.—To be abstracted later.

88. Wright, C. H. **Aloe concinna.** Curtis Bot. Mag. **15**: *Pl. 8790* (*colored*). 1919.—To be abstracted later.

89. Zimmerman, H. E. **Cultivated blueberries.** Amer. Bot. **25**: 7–8. *1 fig.* 1919.—A yield of 1741 quarts per acre in Indiana is reported.—*W. N. Clute.*

90. Wilcox, R. B. **Cranberry disease investigations in New Jersey during 1918.** Proc. Ann. Meet. Amer. Cranberry Growers' Assoc. **49**: 15–21. 1919.—Cranberries picked while wet from dew or rain and placed immediately in storage decayed badly while similar lots from which the surplus moisture had been dried by storing in an open crib, kept practically as well as those which had dried on the vines. The use of large amounts of nitrogenous fertilizers favored excessive growth of the vines and tender berries that rotted severely. The development of the bitter rot [*Glomerella cingulata vaccinii*, Shear] was closely connected with intervals of wet weather and was controlled by Bordeaux mixture best when applied just previous to a rainy period. [See Bot. Absts. 2, Entry 303.]—*J. K. Shaw.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

91. Ewart, Alfred J. **Native fibre plants.** Jour. Dept. Agric. Victoria **16**: 747–750. 1918. The qualities of the native fiber plants are discussed. Fibers from the bark of *Eucalyptus obliqua, Acac a penninerveris, Melaleuca ericifolia, Brachychiton, Pimelea, Casuarina stricta, C. suberosa, Bedfordua salicena, Lavatera plebeja*, the Australian hollyhock, *Urtica, Xanthorrhoea Australis* and *X. Hastilis* and *Poa Caespitosa* are described.—*J. J. Skinner.*

92. Loeb, J. **The physiological basis of morphological polarity in regeneration.** Jour. Gen. Physiol. **1**: 337–362. *Fig. 1–18.* 1919.—See Bot. Absts. 2, Entry 859.

93. Scott, D. H. **On the fertile shoots of Mesoxylon and an allied genus.** Ann. Bot. **33**: 1–21. *Pl. 1–3, fig. 1–3.* 1919.—See Bot. Absts. 3, Entry 95.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

94. SAHNI, B. **On an Australian specimen of Clepsydropsis.** Ann. Bot. 33: 81–92. *Pl. 4, 2 fig.* 1919. The structure is described of a *Clepsydropsis* collected in New South Wales in rocks probably of Carboniferous Age. The leaf trace in this genus arose as a closed ring which became flattened and then clepsydroid as a result of a median constriction. *Clepsydropsis* and *Ankyropteris* should be united in one genus. The two groups of Zygopterideae, were sharply distinct in regard to habit, the Clepsydroideae having upright stems with radially disposed leaves, and the Dineuroideae creeping rhizomes with leaves confined to the dorsal surface.—*W. P. Thompson.*

95. SCOTT, D. H. **On the fertile shoots of Mesoxylon and on allied genus.** Ann. Bot. 33: 1–21. *Pl. 1–3, fig. 1–3.* 1919.—The structure of the fertile shoots of *Mesoxylon multirame* is described. The important result is that *Mesoxylon* bore a *Cordaianthus* in all respects comparable to the inflorescence of Cordaites. The fertile shoot consists of a flattened main axis, naked below, and bearing distichously arranged bud-like branches lying in the plane of the major axis of the shoot. Each branch bears numerous spirally arranged bracts, each with a single vascular bundle of mesarc structure. No reproduction organs are attached to the specimens, but the shoots are commonly associated with *Mitrospermum* (*Cardiocarpon*) *compressum.* The author emphasizes the doubtful nature of the evidence from association but concludes that these seeds probably belonged to the plant. Stems and bud-like shoots are also described which resemble *Mesoxylon* in all important respects except that the leaf trace is single. They are placed in a new genus, *Mesoxylopsis.*—*W. P. Thompson.*

PATHOLOGY

DONALD REDDICK, *Editor*

96. BARKER, B. T. P., AND C. T. GININGHAM. **Further experiments on the Rhizoctonia disease of asparagus.** Ann. Rept. Agric. Hortic. Res. Sta. Univ. Bristol 1917: 28–32 [1918]. Continuation of work with soil disinfectants to kill *Rhizoctonia violacea* var. *asparagi* (See

PLOT	YEAR	TREATMENT	OUNCES PER SQUARE YARD	DISEASE RATING
A	1916	Lime	30	
	1917	Lime	30	7
B	1916	Iron sulfate	0.75	
	1917	Untreated		7
C	1916	Creosote	1	
	1917	Creosote	1	4
D	1916	Carbolic acid	2	
	1917	Creosote	1	3
E	1916	Untreated		
	1917	Untreated		10
F	1916	Naphthalene	2	
	1917	Bleaching powder	2	2
G	1916	Bleaching powder	2	
	1917	Bleaching powder	2	1

Rept. 1916: 39–40). Various substances were applied to the soil about the middle of April and 3 weeks later carrot seed was planted (carrots are said to be equally susceptible to the disease). There was no interference with germination in any case. Application of the fungicides after the fungus presumably has entered the vegetative state is thought to be advantageous. In the table those materials shown as not tested a second time did not give promise of success.

Treatment of soil bearing a perennial crop like asparagus is under investigation.—*D. Reddick.*

97. Beach, Walter S. **The Fusarium wilt of China aster.** Rept. Michigan Acad. Sci. **20**: 282–307. *Pl. 18–22.* 1918.—A disease of China aster is described which causes a damping off of seedlings and a wilting of older plants. A species of *Fusarium* related to *F. conglutinans* Wollenw. was isolated from diseased tissue and its pathogenicity on the aster proved. It differs from the above-named species, however, in several slight morphological characters and in its ability to produce a disease in cabbage. On the other hand *F. conglutinans* produced a wilting of China asters in one set of experiments, but not typical of the wilt disease here described. The name *F. conglutinans* var. *callistephi* n. var. is proposed for the aster fungus. It is thought that the fungus is disseminated on the seed but having once been introduced into a new field it persists in the soil. [See Bot. Absts. 2, Entry 624.]—*W. H. Burkholder.*

98. Butler, E. J. **The rice worm (Tylenchus angustus) and its control.** Mem. Dept. Agric. India (Bot. Ser.) **10**: 1–37. *Fig. 1–4.* 1919.—A large area, comprising six million acres of rice land in Bengal, is infected with the disease, locally known as "ufra" which has been found to be due to the nematode, *Tylenchus angustus.* It is stated that no plant disease, except the cereal rust, has done such great damage. The nematode feeds exclusively on living rice. Its control is more of an agricultural problem than a pathological one. It is shown that the destruction of the stubble of the winter rice will alone effect a great improvement. This together with thorough cultivation of the soil before sowing destroys the worm.—*J. J. Skinner.*

99. Conradi, A. F., and H. W. Barre. **Orchard Spraying.** South Carolina Agric. Exp. Sta. Ext. Circ. **17.** *8 p.* 1919.

100. Cotton, A. D. **Apple canker (Nectria ditissima).** Jour. Bd. Agric. [London] **24**: 1263–1266. *2 fig.* 1918.

101. Davis, W. H. **The aecial stage of alsike clover rust.** Proc. Iowa Acad. Sci. **24**: 461–477. 1917 (1918).—See Bot. Absts. 3, Entry 353.

102. Eriksson, Jakob. **Zur Entwickelungsgeschichte des Spinatschimmels (Peronospora spinaciae (Grew.) Laub.) [Life history of P. spinaciae.]** Ark. för Bot. **15**^{15} : 1–25. *Pl. 4, 3 fig.* 1918.

103. Ferdinandsen, C. S., (Mrs.) S. Rostrup, and F. K. Ravn. **Oversigt over Landbrugsplanternes Sygdomme i 1917. [Report on diseases and pests in farm crops 1917.]** Tidskr. Planteveal **25**: 314–340. Kjöbenhavn, 1918.—In this 34th annual report from Denmark is mentioned 69 plant diseases. Stripe disease of barley has been prominent; on the Prentice variety, which is otherwise very resistant, was recorded 5 to 25 per cent plants diseased. The foot disease caused by *Fusarium culmorum* and other species, has been very common in the cereals due partly to moist weather at the harvest of 1916, partly to a very cold winter followed first by a cold and wet spring, and then by a very intensive drought.—Crowngall (*Bact. tumefaciens*) is recorded from fodder beets, sugar beets and fodder-sugar beets, but has been of no economic importance. Mosaic on beets has been harmful in the seed-producing districts, where cases with 50 per cent or more are reported.—The late blight of potatoes (*Phytophthora infestans*) appeared rather late, but still the bordeaux spraying gave good returns. Verticillium wilt (*V. alboatrum*) is recorded for the first time. Leaf roll of potatoes was conspicuous in the dry summer, and on one field hardly one plant was free; in a variety test at one of the experiment stations, seedlings have been badly attacked.—A single case of crowngall of alfalfa (*Urophlyctis alfalfae*) was found, the first in the country. Corn smut (*U. maydis*), which was found on corn grown in a garden, is also new.—*Ernst Gram.*

104. FISCHER, C. E. C. **Cause of the spike disease of sandal (Santalum album).** Indian Forester 44: 570–575. 1918.—Observations on the disease which support Coleman's idea of the infectious nature of the disease as opposed to the autogenetic theory proposed by Hole.—It is suggested that the disease was introduced by American missionaries on *Lantana camara* a plant which suffers from a spike disease, that the infectious agent may be ultra-microscopic and that it may be carried by sucking insects. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1303, 1304; 3, Entry 121.]—*D. Reddick.*

105. GARBOWSKI, L. **Les champignons parasites recueillie dans le gouvernement de Podolie (Russie) pendant l'eté 1915. [Parasitic fungi collected in Podolia in 1915.]** Bull. Soc. Mycol. France 33: 73–91. 1918.—Abst. in Bot. Centralbl. 138: 280. 1918.

106. GARMAN, H., AND CARRIE LEE HATHAWAY. **Treatment of seed wheat with formalin.** Kentucky Agric. Exp. Sta. Circ. 22: 23–27. 1918.—Experimental evidence to show that the viability of wheat seed may be reduced by treating with formaldehyde solution at the strength employed, 1 pint of formaldehyde to 30 gallons of water.—*D. Reddick.*

107. HAYES, H. K., AND E. C. STAKMAN. **Rust resistance in timothy.** Jour. Amer. Soc. Agron. 11: 67–70. 1919.—Eleven Cornell and 6 Minnesota varieties of timothy were sprayed with rust spores and data taken on the amount of infection. The Minnesota selections were very susceptible to the rust while the Cornell selections showed a high percentage of resistant plants. The results indicate that the production of a rust-resistant timothy could be easily accomplished.—*J. J. Skinner.*

108. HUMPHREY, HARRY B. **Cereal diseases and the national food supply.** U. S. Dept. Agric. Yearbook 1917: 481–495. *Pl. 70–73, 8 fig.* 1918.—The importance of cereal diseases, chiefly smuts and rusts, but also scab, bacterial diseases, etc., is discussed. In 1916, the spring wheat growers paid the largest cereal-disease toll ever paid in the United States. Eleven smut diseases and twelve rust diseases are compared as to relative damage produced. A discussion of seed treatment for smuts on a national scale is presented. For the control of rusts definite progress is indicated in breeding and selecting for rust-resistance. Many difficulties, however, stand in the way. Crossing rust-resistant durums and emmers with common wheats has thus far failed to yield a hybrid which is entirely satisfactory. The author is enthusiastic over hybrids obtained by crossing Kubanka and Haynes, and Kubanka and Preston. Among the hard red winter wheats three (Kanred, P 1066 and P 1068) are remarkably rust-resistant, the Kanred, especially meeting the requirements in yield, milling and baking.—*L. R. Hesler.*

109. JENSEN, C. O. **Undersigelser vedrorende nogle svulstlignende Dannelser hos planter. [Investigations upon certain tumor-like formations in plants.]** Kgl. Vetr. Lbhsk. Aarsskrift 1918: 90–143. *Pl. 1, fig. 1–17.* Kjöbenhavn, 1918.—A summary in English is appended.—The tumors formed on the leaves of *Ectreveria carundulata* have been investigated; inoculation and transplantation have given no positive information on the biological quality of the tissue. Transplantation of the nodules formed on the roots of the hybrids between *Brassica campestris* and *Brassica napus* have resulted in no abnormal growth. These nodosities cannot be considered analogous to the malign animal tumors.—The aspect, size and effect on the plants of the tumors occurring on the roots of *Beta vulgaris* vary with the different cultivated forms; the tumors are caused by *Bacterium tumefaciens*, but in older tumors the bacteria die off. Nevertheless, tissue from spontaneous tumors can be transplanted easily to normal roots, and produce fresh tumors, originating solely from the transplanted tissue, and with the structure and appearance determined by the original plant, which is shown in a striking way, when transplantation is effected with varieties of different color.—Transplantation was successful through four generations; the pathogene was never isolated from these secondary tumors, and it, therefore, seems that the abnormal proliferative power, due to the pathogene, remains with the cells for some cell-generations independent of the continued stimulus.—By inoculation from pure cultures, tumors have resulted, varying on the different varieties ex-

actly as the spontaneous tumors, easily transplanted, and giving pure cultures of *B. tumefaciens* with no difficulty.—The cultures obtained by Friedeman from disease tumors have nothing to do with *B. tumefaciens*; the observations by Blumenthal and Hirschfeld, that *B. tumefaciens* should be able to confer the tumor-producing power to other bacteria in a culture is undoubtedly incorrect.—*Ernst Gram.*

110. McRae, W. **Blast of paddy.** Agric. Jour. India 14: 65–70. 1919.—The failure of the variety of rice (*Oryza sativa*) in 1918 in a large number of districts of India is reported, the decrease being due to a fungous disease. The disease first appears as small spots on the leaves and extends through the tissues appearing on both upper and lower surfaces. The leaf is brownish at first, the center becoming pale yellow. Spots appear on the leaf-sheath as well as on the leaf-blade. The stem finally collapses. The diseased plant produces no rice. The disease was found on several other varieties, but no widespread trouble was noted except on *Oryza sativa*. The fungus which was found is recognized as *Piricularia oryzae*. The control of the disease is by cultural and selective methods.—*J. J. Skinner.*

111. Narasimhan, M. J. **A preliminary study of the root-nodules of Casuarina.** Indian For. 44: 265–268. *Pl. 15.* 1918.—Nodules have been found on the roots of *C. glauca*, *C. stricta* and *C. quadrivalvis*, and are thought to be characteristic of the genus.—The nodule is a cylindrical body with a slightly swollen hyalin tip; the young nodule is whitish but later becomes brown and more or less woody. By repeated branching a cluster is formed "which attains a fairly large size."—Rod-shaped bacteria are present in the nodules. They have the characteristics of the bacteria in legume tubercles including the ability to fix nitrogen.—Further work has yet to be done in the direction of inoculating *Casuarina* seedlings to see if nodular formation can be induced. [See Bot. Absts. 1, Entry 1454.]—*D. Reddick.*

112. Patouillard. M. **Sur le parasitisme de l'Ustulina vulgaris.** [**The parasitism of Ustulina vulgaris.**] Bull. Soc. Path. Vég. France 4: 100. 1918.—This fungus, usually regarded as a saprophyte is said to appear to have caused the death of two basswood trees (*Tilia* sp.) The evidence given is the presence of stromata of the fungus on lesions at the base of the trees. [See Bot. Absts. 1, Entry 1366.]—*C. L. Shear.*

113. Petherbridge, F. R. **Potato spraying trials.** Jour. Bd. Agric. [Great Britain] 25: 1166–1172. 1919.—Bordeaux mixture (2 per cent) and Burgundy mixture (2 per cent) were applied at the rate of 100 gallons per acre. Bordeaux powder was used at the rate of 30 pounds per acre. Both the liquids were about equally effective in checking the blight (*Phytophthora*,) the result being a lengthening of the growing period of the leaves and stems, thereby increasing the total yield of the crop as well as reducing the proportion of diseased tubers.—After application, the wet sprays were well retained on the leaves in spite of heavy rains. Much of the dry powder, however, was washed off, and, therefore, was proportionately ineffective. If used at all, powder should be applied in the early morning during a heavy dew.—In spraying crops of potatoes which have a heavy foliage, it is difficult to cover all the leaves and there is need for a machine of a good design, having several nozzles, and a pump of sufficient power to discharge uniformly at least 200 gallons of liquid per acre.—*W. Southworth.*

114. Sanders, J. G. **The discovery of European potato wart disease in Pennsylvania.** Jour. Econ. Entomol. 12: 86–90. *Pl. 3.* 1919.—Concerning the discovery of the potato wart disease *Chrysophlyctis endobiotica* on *Solanum tuberosum*, growing in home gardens in Luzerne County, Pennsylvania in September, 1918, and the survey rapidly organized and carried out by state and federal workers. The disease was found to be in the anthracite coal mining area of northeastern Pennsylvania and not in the commercial potato region. The fact was brought out that the disease most likely came from Germany on potatoes purchased by the villagers from stores of the mining companies who in turn purchased several car loads of potatoes from Germany through the Hazelton Produce Company in 1911 and early 1912. The Federal quarantine on European potatoes was fixed on September 20, 1912. Tomatoes, *Lycopersicum esculentum* in infested soil were free from disease while *Solanum dulcamara* is slightly affected.—*A. B. Massey.*

115. SCHOEVERS, T. A. C. **Vreemde lichaampjes in zieke spinaziewortels.** [**Unknown corpuscles in diseased spinach roots.**] Meded. Landbouwhoogeschool Wageningen 15: 75–(84). *Pl. 10.* 1918.—English résumé on p. 83.—The main roots of diseased plants are somewhat shriveled and black; the smaller rootlets are similarly affected or are absent. Cells of root parenchyma are filled with small, ($15 \times 5\,\mu$), somewhat spindle-shaped bodies. The bodies have the power of movement but this was seldom observed. Attempts to cultivate them were unsuccessful as were infection experiments. "Although it is by no means proved, the author is inclined to think, that these newly discovered X-organisms, as he proposes to call them for the present, are a form of not yet described protozoa."—*D. Reddick.*

116. SMITH, RALPH E., E. O. ESSIG, AND GEO. P. GRAY. **Handbook of plant disease and pest control.** California Agric. Exp. Sta. Circ. 204. *36 p.* 1918.

117. SPINKS, G. T. **Damping-off and collar rot of tomatoes.** Ann. Rept. Agric. Hortic. Res. Sta. Univ. Bristol 1917: 25–27. [1918].—Damping-off occurs in seedlings and collar rot in plants up to a foot in height. The cause of the trouble is an undetermined species of *Phytophthora.* The fungus persists for a long time in soil but in what condition is not known.—*D. Reddick.*

118. STEWART, ALBAN. **A consideration of certain pathologic conditions in Ambrosia trifida.** Amer. Jour. Bot. 6: 34–46. *Pl. 2, fig. 1.* 1919.—The author first describes the normal internal structure of the stem of this species, and then the modifications in structure caused by attacks of *Protomyses andinus* Lagh., of the stem borer, *Papaipema nitela* Gn., of both the fungus and the insect together, and by mechanical wounds. There is little misplacement of xylem cells in the galls formed by the parasites. Increase in parenchyma at the expense of the xylem, broadening of the rays, and reduction in number and size of vessels, are more marked in the *Protomyces* gall than in that of the insect. Mechanically wounded tissue is characterized by radical misplacement of the cells, vertical shortening of the rays, increase in parenchyma and reduction in number of vessels. Where both insect and fungus have acted together, the resulting tissue is characteristic of the fungus gall, the stimulus from the insect being inactive. The stimulus from the insect, though weaker, is able to exert an influence much farther away from the source of the stimulus than is the stimulus from the fungus.—*E. W. Sinnott.*

119. TREVOR, C. G. **A fungus attack on the deodar.** Indian Forester 44: 130–131. 1918. —Referring to article by GLOVER, Indian Forester 43: Dec. 1917, author states that the plants shown in the illustration "exhibit all the symptoms of plants suffering from insufficient light." —*D. Reddick.*

120. TROTTER, A. **La "rabbia" o "antracnosi" del cece ed il suo produttore.** [**Rabbia or anthracnose of chick-pea and its cause.**] Rev. Patol. Veg. 9: 105–114. 1918.—See Bot. Absts. 3, Entry 376.

121. VENKATARAMA, AYYAR, K. R. **Is spike disease of sandal (Santalum album) due to an unbalanced circulation of sap?** Indian For. 44: 316–324. *Pl. 19.* 1918.—A criticism, with supporting evidence, of: HOLE, R. S. Indian For. 43: 430–431. 1917. [See Bot. Absts. 2, Entries, 1297, 1298.]—Seven sandal trees were isolated from any host by deep encircling trenches and by keeping free from vegetation the soil within the trenches. One tree has remained healthy for 24 months and 6 trees for 18 months.—Roots were severed, haustoria cut off and sulfuric acid injected in roots to simulate damage done by fire. At the end of 15 months the wounds were largely healed, and the trees healthy.—On two occasions heat from burning brush killed or injured several sandal trees but those not too badly damaged put out healthy foliage. —Clearing out all trees except sandal in a large area gave a sudden change of "conditions necessary for an unbalanced circulation of sap" but the spike disease did not appear.—Experiments in girdling never have been accompanied or followed by spike disease.—The conclusion is reached that unbalanced circulation of sap is not the cause of spike disease. [See also Bot. Absts. 2, Entries 1177, 1297, 1303, 1304; 3, Entry 104.]—*D. Reddick.*

122. Wilcox, R. B. **Cranberry disease investigations in New Jersey during 1918.** Proc. Ann. Meet. Amer. Cranberry Growers' Assoc. 49: 15–21. 1919.—See Bot. Absts. 2, Entry 303; 3, Entry 90.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

123. Clute, W. N. **The money in drug plants.** Amer. Bot. 25: 15–20. 1919.—Prices of crude drugs are regarded as too low to make the growing of drug plants in the United States profitable. A list of the North American official drug plants is given with the price and part used indicated.—*W. N. Clute.*

124. Hotson, J. W. **Sphagnum from bog to bandage.** Publ. Puget Sound Biol. Sta. 2: 211–247. *Pl. 31–48.* March, 1919.—The whole detailed process of making surgical dressings of *Sphagnum* is given. This includes the collecting, storing, baling, sorting and drying. The equipment of a workroom for the purpose is given in detail. It is written from a war emergency standpoint, and with a view to preserving valuable facts about *Sphagnum* possibilities learned through war stress.—*T. C. Frye.*

125. Hotson, J. W. **Sphagnum as a surgical dressing.** *31 p., 18 fig.* Published independently by the Northwest Division of the American Red Cross: Seattle, undated [1918].—It is a general account of the discovery of the utility of *Sphagnum* for surgical dressings, its pre-war surgical use, and the utilization of it in the early years of the world war. Instructions are given as to where and how to get the moss and how to make the dressings of it. A table of absorbency of 6 species from various regions is given. Written primarily as a war emergency paper to be used as a guide in the making of *Sphagnum* dressings.—*T. C. Frye.*

126. Macht, David I. **A pharmacological appreciation of a Biblical reference to mass poisoning, II Kings IV, 38–41.** Bull. of The Johns Hopkins Hospital 30: 38–42. *Fig. 1–2.* 1919. —The Biblical passage is an account of the accidental poisoning of a band of prophets and the antidotal means employed by their leader, the prophet Elisha. The plant that caused the poisoning was called *Paqqù'ôt* and the antidote was *meal.* The derivation of the Hebrew name is given and it is shown from both the botanical and archaeological histories that it applies rather to the Wild Colocynth, *Citrullus Colocynthis* than to the Squirting Cucumber, *Ecballium Elaterium.* Both plants are illustrated and described and the active constituents of each named. Both plants are powerful drastic purgatives, and in overdoses are dangerous poisons, producing enteritis and even death. To test the use of meal as an antidote, experiments were carried out on dogs. A striking primary symptom is profuse salivation which will account for the exclamation of the prophets, on eating their pottage, of which the wild Colocynth was a part, that there was death in the pot. The flour or meal rendered the otherwise poisonous and lethal doses of the plants under discussion, innocuous, substantiating the truth of the Biblical passage and sustaining the popular first aid maxim to give flour in many cases of poisonings.—*Oliver A. Farwell.*

PHYSIOLOGY

B. M. Duggar, *Editor*

METABOLISM (GENERAL)

127. Diénert, F., and A. Guillerd. **Milieu à l'eau de levure autolysée pour la culture du B. coli. [Autolyzed yeast water as a culture medium for B. coli].** Compt. Rend. Acad. Sci. Paris 168: 256–257. 1919.—The high cost of peptone for bacteriological work led to a search for a substitute for it. It was found that among the products of the autolysis of yeast are to be found amino acids—tryptophane, etc.—which are also found in peptone. Bouillon made by substituting autolyzed yeast for peptone yielded two billion bacteria per cc. at the end of 24

hours, which was considered a satisfactory growth. Indol formation and the effects of phenol were satisfactorily demonstrated through the use of yeast bouillon and on analysis its constitution was found to be much more constant than peptone bouillon. The cost of the yeast medium was found to be about one-fifteenth that of bouillon made with peptone.—*V. H. Young.*

128. Ghosh, Manmathanath. **Notes on the hydrocyanic acid content of Jowar. (Andropogon Sorghum).** Agric. Jour. India 14: 107–115. 1919.—The cyanogenetic glucoside present in jowar occurs principally in the leaves and young shoots; the stalk contains only a small amount. The young shoots are very poisonous. Jowar grown in soils having abundant moisture contains less hydrocyanic acid than that grown on dry soil. There was found a greater nitrogen accumulation in the leaves than in the stalks. The appearance of the greater amount of nitrogen with the greater proportion of hydrocyanic acid is taken as an indication that the production of the glucoside is correlated with the production of the nitrogenous matter and lends support to the theory that HCNl is an intermediate product in protein formation.—*J. J. Skinner.*

129. Johns, Carl O., A. J. Finks, and Mabel S. Paul. **Studies in nutrition. I. The nutritive value of coconut globulin and coconut press cake.** Jour. Biol. Chem. 37: 497–502. 1919.—See Bot. Absts. 2, Entry 1271.

130. Morgan, Agnes Fay, and Alice M. Heinz. **Biological values of wheat and almond nitrogen.** Jour. Biol. Chem. 37: 215–222. 1919.

131. Posternak, S. **Sur deux sels crystallisés du principe phospho-organique de réserve des plantes vertes. [Two phospho-organic salts in the reserve of green plants.]** Compt. Rend. Acad. Sci. Paris, 168: 1216–1219. *1 fig.* 1919.—After brief mention of a number of methods for the demonstration of phospho-organic substances in plants, the author describes two salts of phospho-organic nature which he has been able to isolate and crystallize from plant tissues, together with his methods for isolating them. These two substances, a double salt of calcium and sodium and a salt of sodium, have the following empirical formulas: $C_6\ Hl_2\ O_{27}\ P_6\ Ca_2\ Na_8$ and $C_2\ H_4\ O_9\ P_2\ Na_4$.—*V. H. Young.*

132. Sando, Chas. E. **Endothia pigments. II. Endothine red.** Amer. Jour. Bot. 6: 242–251. *3 fig.* 1919.—A pigment named by the author "endothine red" and produced by *Endothia fluens*, was successfully isolated and its chemical characteristics studied and described. Evidence is presented that its formula is $C_7H_5O_4$, and that it is related to the members of the pyrocatechin group.—*E. W. Sinnott.*

133. Schaeffer, G. **Facteurs accessoires de la croissance et de l'equilibre. Vitamines; auximones. [Accessory factors of growth and equilibrium. Vitamines; auximones.]** Bull. Inst. Pasteur. 17: 1–21, 41–59. *Fig. 1–10.* 1919.—This is a review of the advance of the knowledge on vitamines as food accessories, made during the years 1917–1918, and constitutes the continuation of a review that appeared in Bull. Soc. Sci. d'Hyg. 4^5,6, 1918, which covered the period 1914–1917. The subject is divided as follows: (1) Quantitative and qualitative needs in growth and equilibrium. (2). Vitamines or accessory factors of growth and equilibrium according to McCallum and Davis. (3). Avitaminosis. (4). Quantitative variations of vitamines in the regime, minimum quantities necessary. (5). Are other avitaminoses than those brought about by lack of the A and B forms of McCallum possible? (6) Physiological significance of vitamines. (7). Origin of vitamines. (8) Origin and role of vitamines in phanerogams, auximones of Bottomley and Mockeridge. (9) Bacterial origin of auximones, work of Mockeridge. (10) Vitamines, auximones and bacteria. (11) Aseptic life and vitamines. (12) Symbiotes and vitamines. (13) Conclusions. An extended list of the literature is given. The importance of the present paper from a botanical standpoint lies in the connection established by the author between the zoological and botanical phases of the problem. The lack of careful studies on the vitamines of pure cultures of yeast leaves a gap only partially filled

by the work of Bottomley on the action of auximones on *Azotobacter* and their action on the growth of decotiledonized seedlings grown in mineral solutions. The plant acts as intermediary between the soil bacteria that produce auximones and the animal that utilizes them. When animals are subjected to avitaminosis and die as a consequence of incomplete diet, they are found to contain large numbers of *Bacillus coli* in the intestinal tract. This is taken by the author as an indication that this organism is not capable of synthesizing vitamines, while the work of Pacini and Russell on the Eberth bacillus is recalled to show the possibility of such synthesis by bacteria grown in pure cultures in Uschinsky solution. The last consideration leads the author to a hasty review of the question of aseptic life; considering the intestinal flora as parasitic rather than symbiotic he points to the possibility that the bacteria found in normal tissues of animals and in seed coats may be the true elaborators of "food accessories." Thus the author discloses the close relation of the problem of vitamines to the subject of general biology.—*A. Bonazzi.*

METABOLISM (ENZYMES, FERMENTATION)

134. Clute, W. N. **Vinegar bees.** Amer. Bot. 25: 2–4. 1919.—An association of *Saccharomyces pyriformis* and *Bacterium verniforme* is widely distributed in the United States under the name of "vinegar bees." A cupful of the "bees" in a weak saccharine solution (2 tablespoonfuls of sugar to a quart of water) will produce vinegar in three days, the "bees" doubling in amount meanwhile. Vinegar bees are known elsewhere as the "ginger bee plant" and used to produce a foaming beverage with the addition of ginger root. The plant, or plant association, is related to the "kephir grains" used to ferment milk in the Caucasus. —*W. N. Clute.*

135. Dowell, C. T. **Cyanogenesis in Andropogon sorghum.** Jour. Agric. Res. 16: 175–181. 1919.—In the process of drying sorghum there is a considerable loss of hydrocyanic acid, but not all of it disappears. The slower the process of drying, the less the amount of hydrocyanic acid retained in the plant. The enzyme emulsin is still in active condition in sorghum after drying. The addition of dextrose or maltose to sorghum prevents or holds back formation of hydrocyanic acid in macerated sorghum. This may be due to a reaction with hydrocyanic acid or to a lessening of the activity of emulsin.—*L. Knudson.*

ORGANISM AS A WHOLE

136. Beach, Walter Spurgeon. **Biologic specialization in the genus Septoria.** Amer Jour. Bot. 6: 1–33. *Pl. 1, 13 diagrams, 1 graph.* 1919.—See Bot. Absts. 2, Entry 1283.

137. Butler, O. **The effect of environment on the loss of weight and germination of seed potatoes during storage.** Jour. Amer. Soc. Agron. 11: 114–118. 1919.—It was found that the germination of potatoes can be retarded by lowering to 3.74°C. or by reducing the oxygen supply. Germination was retarded more effectively at 9.31°C. in reduced oxygen air than at 3.74°C. in free air. Loss of weight was greatly affected by the relative humidity of the air.—*J. J. Skinner.*

TOXIC AGENTS

138. Fred, E. B. **The effect of certain organic substances on seed germination.** Soil Sci. 6: 333–349. *Pl. 1–4.* 1918.—See Bot. Absts. 2, Entry 1332.

139. Hartwell, B. L., and F. R. Pember. **Unlike effect of acid soils on plants due to aluminum.** Soil. Sci. 6: 259–279. *Pl. 1.* 1919.—See Bot. Absts. 2, Entries 1137; 1334.

140. McHargue, J. S. **Effect of certain compounds of barium and strontium on the growth of plants.** Jour. Agric. Res. 16: 183–194. *Pl. 24.* 1919.—Cowpeas (*Vigna sinensis*), oats (*Avena sativa*), wheat (*Triticum aestivum*), and corn (*Zea mais*) were used in these experiments. The plants were grown in one gallon, earthern jars in sand to which was added 10 grams cal-

cium carbonate, 5 grams magnesium carbonate, 4 grams potassium nitrate, 2 grams potassium chloride, and 2 grams sodium thiosulfate. Under these conditions, the author claims stimulation with barium carbonate for cowpeas, oats, and corn. More marked stimulation was noted with the use of strontium carbonate. Mixtures of these carbonates resulted injuriously as also did barium sulfate. There is included in the discussion the influence of these two carbonates on the partial mineral composition of the plants. No references to previous work are made.—*L. Knudson.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

SPERMATOPHYTES

141. Cardot, J. **Rosacées nouvelles d' extrême-orient.** [New Rosaceae from the extreme orient.] Not. Syst. 3: 353–355, 371–382. Dec. 30, 1918.—New species and varieties, chiefly from China, are described in *Pirus*, *Eribotrya*, *Photinia*, *Raphiolepis*, and *Pygeum*. *J. M. Greenman.*

142. Chamberlain, Charles Joseph. **The living Cycads.** *Small 8vo. p. xiv + 172 p. Fig. 91.* University of Chicago press: Chicago, 1919.—The subject is treated under three main captions, namely, (1) *Collecting the material*, (2) *The Life-history*, and (3) *The evolution and phylogeny of the group.* The volume is written in popular style and presents a general account of the Cycadaceae as a whole. The author's investigations of this group of plants have continued through a period of more than fifteen years and have involved extended travel and careful field study as well as critical laboratory research. Nine living genera are recognized; and it is estimated that there are about one hundred species. The genera are: *Zamia*, *Microcycas*, *Dioon*, and *Ceratozamia* of the Western Hemisphere, *Macrozamia*, *Bowenia*, and *Cycas* of Australia, *Stangeria* and *Encephalartos* of Africa. "A much more extended account, technical in character" is promised by the author in a later publication.—*J. M. Greenman.*

143. Christy, Miller. **The Height of Carduus (Cnicus) palustris.** Jour Bot. 57: 20–21. 1919.

144. Clute, W. N. **The species conception.** Amer. Bot. 25: 26. 1919.—The statement that Underwood's type sheet of *Selaginella arenicola* represents three species of the genus *Selaginella* is challenged.—*W. N. Clute.*

145. Cockerell, T. D. A. **Notes on Lycaste.** Torreya 19: 10–12. 1919.—Three forms of this orchidaceous genus were brought by Mrs. Cockerell from Guatemala, and studied as they flowered in the greenhouse. The form known horticulturally as *Lycaste Skinneri* var. *alba* is published for the first time as a new species (*L. alba* Cockerell). This is distinguished from the true *L. Skinneri* Lindl. by the larger lateral lobes of the lip and the longer bract. *L. cruenta* Lindl. is re-described.—*J. C. Nelson.*

146. Gamble, J. S. **Notes on the flora of Madras.** Bull. Misc. Inf. Kew 1918: 223–228. 1918.—The notes recorded in this article pertain to families treated in the recently published second part of the *Flora of Madras* and supplement previous notes, prepared by Mr. S. T. Dunn, which appeared in the *Kew Bulletin*, 1916, page 58.—*J. M. Greenman.*

147. Gamble, J. S. **Decades Kewenses. XCI.** Bull. Misc. Inf. Kew 1918: 238–242. 1918. —The following flowering plants from South India are described as new to science: *Pygeum sisparense*, *Eugenia discifera*, *Jambosa Bourdillonii*, *J. courtallensis*, *Syzygium palghatense*, *S. travancoricum*, **Meteromyrtus** (a new genus of the Myrtaceae), *M. wynaadensis* (*Eugenia wynaadensis* Beddome), *Osbeckia lineolata*, *O. courtallensis*, and *O. Lawsoni*.—*J. M. Greenman.*

148. Godfrey, M. J. **Epipactis viridiflora Reich.** Jour. Bot. **57**: 37–42. 1919.—*E. viridiflora* Reich. var. *leptochila* is described as new. The validity of *E. viridiflora*, *E. violacea*, and *E. latifolia* as species is pointed out, through a very detailed side by side comparison of characters. Interesting notes on the pollination and hybridization are given. The var. *leptochila* is compared with forma *dunensis* of Wheldon and Travis and forma *vectensis* of Rev. T. Stevens. The intermediates may be of hybrid origin, and therefore would not invalidate the specific distinctness.—*K. M. Wiegand.*

149. Hitchcock, A. S. **A botanical trip to Mexico.** Sci. Monthly **8**: 129–145, 216–238. *34 fig., 5 maps.* 1919.

150. Hutchinson, J. **Primula chasmophila. Balf. f.** Curtis's Bot. Mag. **IV, 15**: *Pl. 8791* (*colored*). 1919.—A new species for the name of which Professor Balfour is responsible. It is a native of Bhutan and belongs to the section *Soldanelloides* generally characterized by rather small leaves and large, conspicuous flowers, those in this species being about three and intensely violet.—*Oliver A. Farwell.*

151. Hutchinson, J. **Tagasaste and Gacia (Cystisus spp.).** Bull. Misc. Inf. Kew **1918**: 21–25. 1918.—The author presents a brief statement concerning the value of "Tagasaste," *Cystisus* proliferus var. *palmensis* Christ, and "Gacia," *C. stenopetalus* Christ, as fodder plants, and incidentally gives a synoptical summary of these species and their immediate allies. Five species are characterized; one of these, *Cystisus Perezii,* endemic to the islands of Grand Canary and Hierro, is new to science. *C. proliferus* var. *palmensis* Christ is raised to specific rank.—*J. M. Greenman.*

152. Hutchinson, J. **Taxotrophis and Balanostreblus.** Bull. Misc. Inf. Kew **1918**: 147–153. 1918.—The author gives a brief history of the two Urticaceous genera mentioned in the title, and also presents a revision of the species. Seven species of *Taxotrophis* are recognized, and of these *T. caudata*, *T. laxiflora*, and *T. Balansae* of India are new. *Balanostreblus* is monotypic, being represented by one species, *B. ilicifolia* Kurz, from Burma.—*J. M. Greenman.*

153. Hutchinson, J. **Notes on African Compositae. V.** Bull Misc. Inf. Kew **1918**: 178–181.—1918. The present article consists of a synopsis of the genus *Hippia* as represented in South Africa. Six species are enumerated and of these, one, *H. trilobata*, is new to science, and a second, *H. pilosa*, is a new combination in this genus.—*J. M. Greenman.*

154. Hutchinson, J. **Cordia Myxa and allied species.** Bull. Misc. Inf. Kew **1918**: 217–222. *3 fig.* 1918.—A brief historical account is given of *Cordia Myxa* L. and the two allied species *C. obliqua* Willd. and *C. crenata* Del., supplemented by a full bibliography and distributional notes.—*J. M. Greenman.*

155. Pott, Mrs. R. **A new species of Warburgia from the Transvaal.** Ann. Transvaal Mus. **6**: 60–62. *Fig. 2.* 1918.—*Warburgia Breyeri* is described and illustrated from specimens collected on the western slope of Drakensberg, near Macoutsie River.—*J. M. Greenman.*

156. Praeger, R. Lloyd. **Notes on Sedum.—III.** Jour. Bot. **57**: 49–58. 1919.—A continuation of the author's article in Jour. Bot. **56**: 152. 1918. Seven species and three varieties are described as new. The novelties are as follows: *S. Cooperi*, from Bhutan; *S. crassipes* Wall. var. *cholaense*, Chola Valley, East Sikkim; *S. dasyphyllum*, L. var. *Suendermanni*, Spain; *S. rubroglaucum*, Yosemite Valley, Calif.; *S. anoicum*, origin not known; *S. Mairei*, Yunnan; *S. triphyllum*, Yunnan; *S. variicolor*, Yunnan; *S. indicum* A. Hamet var. *densirosulatum*, Yunnan; *S. viscosum*, Yunnan.—*K. M. Wiegand.*

157. Prain, D. **The genus Chrozophora.** Bull. Misc. Inf. Kew **1918**: 49–120. 1918.—A detailed history of the Euphorbiaceous genus *Chrozophora* is given, and this is followed by a synoptical revision of the species. The genus is widely distributed in the Old World and, as at present defined embraces eleven species and several varieties.—*J. M. Greenman.*

158. Prain, D. **A new Meconopsis from Yunnan.** Bull. Misc. Inf. Kew 1918: 211–213. 1918.—*Meconopsis compta* is described as a new species, based on specimens collected by Mr. George Forrest in southeastern Tibet.—*J. M. Greenman.*

159. Rock, J. F. **Cyrtandreae hawaiienses, sections Schizocalyces Hillebr. and Chaetocalyces Hillebr.** Amer. Jour. Bot. 6: 47–68. *Pl. 3–8.* 1919.—The present paper is the third in a series dealing with the genus *Cyrtandra* as represented in the Hawaiian Islands. Twelve species and nine varieties are recognized under the section *Schizocalyces,* and six species and three varieties are referred to the section *Chaetocalyces.* The following are either new or result from a recombination of names: *Cyrtandra lysiosepala* (Gray) Clarke var. *Fauriei* (*C. Fauriei* Lév.), *C. lysiosepala* (Gray) Clarke var. *latifolia* (*C. lysiosepala* var. β Hillebr.), *C. lysiosepala* (Gray) Clarke var. *haleakalensis, C. lysiosepala* (Gray) Clarke var. *Grayi* (*C. Grayi* Clarke), *C. Conradtii, C. Grayana* Hillebr. var. *linearifolia, C. Grayana* Hillebr. var. *lanaiensis, C. Grayana* Hillebr. var. *nervosa, C. Oliveri, C. kohalae, C. halawensis, C. umbracculiflora, C. Kalichii* Wawra var. *tristis* (*C. tristis* Hillebr.), and *C. Macraei* Gray var. *parvula.*—*E. W. Sinnott.*

160. Rolfe, R. A. **New orchids. Decade XLVI.** Bull. Misc. Inf. Kew 1918: 234–238. 1918.—The following species of orchids are described as new to science: *Pleurothallis grandis* from Costa Rica, *Bulbophyllum robustum* from Madagascar, *Maxillaria parviloba* from Peru, *Chrysocycnis Lehmanii* from Ecuador, *Vanilla Havilandii* from Borneo, *V. andamanica* from tropical Asia, *Listrostachys floribunda, Peristylus ugandensis, P. Snowdenii,* and *Habenaria Hunteri* from tropical Africa.—*J. M. Greenman.*

161. Rydberg, P. A. **Key to the Rocky Mountain flora.** *8vo. 304 p.* Published by the author: New York, 1919.—The present volume consists of a reprint of the keys in the "Flora of the Rocky Mountains and Adjacent Plains" recently published by the same author. It is intended for use in the field.—*J. M. Greenman.*

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ENTRIES 162-457

AGRONOMY

C. V. PIPER, *Editor*

162. RICHARDSON, A. E. V. **Agriculture. America and Australia compared.** Jour. Dept. Agric. Victoria 17: 1–20. 1919.—A lecture, comparing agricultural methods in America with those in Australia, before the Royal Agricultural Society at Melbourne, Dec., 1918.—*J. J. Skinner.*

163. HAYES, H. K., AND E. C. STAKMAN. **Rust resistance in timothy.** Jour. Amer. Soc. Agron. 11: 67–70. 1919.—See Bot. Absts. 3, Entry 107.

164. CARRIER, LYMAN. **A reason for the contradictory results in corn experiments.** Jour. Amer. Soc. Agron. 11: 106–113. 1919.

165. ARNY, A. C., AND R. J. GARBER. **Field technic in determining yields of plots of grain by the rod-row method.** Jour. Amer. Soc. Agron. 11: 33–47. 1919.—Data is given (1) on the precision obtained by determining yields by the removal of rod-rows from tenth-acre plots as compared with harvesting and thrashing the entire plots, and (2) the comparative labor requirements of determining yields by the two methods. It was found that nine rod-rows removed from tenth-acre plots gave practically as accurate indications of the value of fertilizer treatments as harvesting the product of the entire plots. Details of the methods used are given together with a discussion of the literature. [See Bot. Absts. 3, Entry 2079.]—*J. J. Skinner.*

166. ARNY, A. C., AND F. H. STEINMETZ. **Field technic in determining yields of experimental plots by the square yard method.** Jour. Amer. Soc. Agron. 11: 81–106. 1919.—It was found that yields determined from 4 to 5 systematically distributed square yard areas removed from plots one-tenth acre in size or less of relatively uniform crop may be confidently substituted for those from the entire plot. A large mass of data is presented showing the probable errors in plot work.—*J. J. Skinner.*

167. WINTERS, R. Y. **Community cotton improvement in North Carolina.** Jour. Amer. Soc. Agron. 11: 121–124. 1919.—In a test of 9 varieties of cotton seed the Cleveland variety produced largest yield.—*J. J. Skinner.*

168. BUTLER, O. **The effect of environment on the loss of weight and germination of seed potatoes during storage.** Jour. Amer. Soc. Agron. 11: 114–118. 1919.—See Bot. Absts. 3, Entry 137.

169. Matson, J. **Lucerne: Why an irrigated crop.** Agric. Jour. India 14: 85–90. 1919.—The experiments recorded, show that unirrigated lucerne can be established successfully in India on most soils of the Gangetic plain and where there is sufficient moisture in the subsoil it produces large yields. The yield was not as large as on the best irrigated soil. The unirrigated lucerne withstands the monsoon better than the irrigated.—*J. J. Skinner.*

170. Kattur, G. L. **An improved type of cotton for the southern Maratha country.** Agric. Jour. India 14: 165–167, *Pl. I.* 1919.—The locally grown cotton for the Southern Maratha Country, *jowari-halti* is sown in August and matures in March. It is a stunted plant producing about 320 pounds seed cotton per acre. The staple is long though uneven and weak. An erect type has been produced from the local cotton, which fruits earlier and yields 12 per cent more. The improved type is superior to any of the Kumpta cottons, and is described as high, clean, long in staple, uniform, and of middling strength.—*J. J. Skinner.*

171. Cutler, G. H. **A dwarf wheat.** Jour. Amer. Soc. Agron. 11: 76–78. 1919.—Among the Marquis wheat growing at the University of Alberta appeared a dwarf variety about 9 inches high. The origin of this peculiar form was not determined.—*J. J. Skinner.*

172. Osborne, T. B., and L. B. Mendel. **The nutritive value of the wheat kernel and its milling products.** Jour. Biol. Chem. 37: 557–601. 1919.—The by-products of millimg are better utilized on the farm than on the table. The aim of the miller should be to effect such a separation of the other parts of the wheat kernel from the endosperm as will lead to a minimal transfer of the latter into offal. Every grade of flour which is made with a loss of endosperm into milling by-products represents a loss of human nutrients.—*George B. Rigg.*

173. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. 11: 143–162. *2 fig.* 1919.—See Bot. Absts. 3, Entry 2161.

174. Stewart, George. **The varieties of small grain and the market classes of wheat in Utah.** Jour. Amer. Soc. Agron. 11: 163–169. 1919.—A survey was made of the wheat, oats and barley grown in Utah in 1918, and the varieties determined. It was found that the varietal names are frequently misapplied and the varieties badly mixed. The Dicklow and New Zealand varieties on irrigated farms and Turkey, Kofod, Bluestem and Gold Coin varieties on the dry farms were found to be the most common wheats grown. The Swedish Select variety of oats was grown universally.—*J. J. Skinner.*

175. Koch, G. P., and J. R. Butler. **Cross-inoculation of legumes.** Soil Sci. 6: 397–403. 1918.—See Bot. Absts. 3, Entry 362.

176. Warburton, C. W. **The occurrence of dwarfness in oats.** Jour. Amer. Soc. Agron. 11: 72–76. *Fig. 1–2.* 1919.—The occurrence of dwarfness in Victory oats planted at Aberdeen, Idaho, is reported. Seeds from the original selection proved that the dwarf strain is recessive.—*J. J. Skinner.*

177. Summer, James B. **The globulins of the jack bean. Canavalia ensiformis. Preliminary paper.** Jour. Biol. Chem. 37: 137–142. 1919.—See Bot. Absts. 3, Entry 133.

178. Tottingham, W. E. **A preliminary study of the influence of chlorides on the growth of certain agricultural plants.** Jour. Amer. Soc. Agron. 11: 1–32. 1919.—See Bot. Absts. 2, Entry 1316.

179. Wooton, E. O. **Certain desert plants as emergency stock feed.** U. S. Dept. Agric. Bull. 728. *27 p., 8 pl., 1 fig.* 1919.—In western Texas and the southern parts of Arizona and New Mexico, *Yucca elata* occurs on sandy plains in greater or less abundance. It is usually referred to by the English-speaking population as "soap weed," but is often called *amole* or *palmilla*, the latter its proper Mexican name. It is called "soap weed" and *amole* becaues its roots and stems are frequently used as a soap substitute.—Newly devised shredding

machines have made it possible to convert into usable form the nutritious stems and leaves of yucca, as well as similar plants, thus developing a highly valuable emergency stock feed.—Mature cattle are fed 20 to 40 pounds of shredded soap weed and 1 to 2 pounds of cottonseed cake per day. With the chopped feed alone, 20 to 25 pounds per day will save stock from starvation. With a pound of cottonseed cake in addition, a fairly well-balanced ration is secured.—The average cost of feeding 20 pounds of chopped soap weed per animal is about 50 cents a month. With the addition of cottonseed cake when worth $67 per ton at the ranch, animals can be kept in good condition, and sometimes improved, for about 5 cents per day per animal at the present prevailing prices of labor, fuel, oil, etc.—It has been proven that most of the species of yucca are not likely to recover after cutting. The most valuable species, *Yucca clata* (soap weed) and *Yucca glauca* (bear-grass), may be expected to recover, the former slowly and the latter more rapidly, especially if the plants are not cut too close and are given opportunity to grow.—*C. V. Piper.*

180. Forsling, C. L. **Chopped soapweed as emergency feed for cattle on southwestern ranges.** U. S. Dept. Agric. Bull. 745. *20 p., 5 pl.* 1919.—On these great arid plains, the greatest handicap to the stock industry has been eliminated by the proper use of soapweed (*Yucca elata*) as a cattle feed during the extended droughts. The dead basal leaves are burned off; the remainder of the 3-foot tall plants is chopped or shredded by recently invented machines. The cattle thrive upon it and relish it, especially when shredded, either fresh, as ensilage, or in combination with cotton-seed meal. Analyses of chopped soapweed compare favorably with those of native forage grasses for feed. Conservation is necessary since soapweed grows very slowly and is the only protection the cattle have from wind storms. A number of smaller related species are likewise used, more profitably, however, as ensilage. [See Bot. Absts. 2, Entry 652.]—*A. R. Bechtel.*

181. Federal Horticultural Board. U. S. Dept. Agric. **Amendment No. 2 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements 61. *33 p.* 1919.—See Bot. Absts. 3, Entry 400.

182. Federal Horticultural Board. U. S. Dept. Agric. **Nursery stock, plant and seed quarantine. Notice of quarantine No. 37, with regulations.** Service and regulatory announcements 57: 101–110. 1919.—See Bot. Absts. 3, Entry 401.

183. Drake, J. A., and J. C. Rundles. **Sweet clover on corn belt farms.** U. S. Dept. Agric. Farmers' Bull. 1005. *28 p., fig. 1–9.* 1919.

184. Yoder, P. A. **Growing sugar cane for sirup.** U. S. Dept. Agric. Farmers' Bull. 1034. *35 p., fig. 1–15.* 1919.

185. Anonymous. **Geography of U. S. botanical drugs.** Pharm. Era 52: 63–66, 89–92. *9 fig., 2 maps.* 1919.—See Bot. Absts. 3, Entry 424.

186. Skinner, J. J., and F. R. Reid. **The influence of phosphates on the action of alpha-crotonic acid on plants.** Amer. Jour. Bot. 6: 167–180. *Fig. 1–9.* 1919.—See Bot. Absts. 3, Entry 437.

187. Porter, W. R., and O. A. Stevens. **Sow thistle and other weeds of similar habits.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 18. *12 p., fig. 1–9.* 1919.—Deals with *Sonchus arvensis, Carduus arvensis* [*Circium arvense,*] *Agropyron repens, Linaria Linaria, Euphorbia Esula* and *Convolvulus arvensis.*—*L. R. Waldron.*

188. Waldron, L. R. **Alfalfa for North Dakota.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 19. *8 p.* 1919.

189. Yampolsky, Cecil. **Potato seed plot and certification of potato seed stocks.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 21. *4 p., fig. 1–2.* 1919.

190. Waldron, L. R. **Sweet clover for North Dakota.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 20. *8 p., fig. 1–4.* 1919.

191. Werner, H. O. **Potato culture in North Dakota.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 22. *8 p.* 1919.

192. Waldron, L. R., and W. R. Porter. **Brome-grass, slender wheat-grass and timothy.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 24. *8 p.* 1919.—Deals with *Bromus inermis, Agropyron tenerum,* and *Phleum pratense.—L. R. Waldron.*

193. Anonymous. **Conversion of grass land into tillage.** Jour. Dept. Agric Ireland 19: 215–218. *1 fig.* 1919.—Considers selection, cultivation, and use of tilled crops.—*Donald Folsom.*

194. Anonymous. **Permanent pasture grasses.** Jour. Dept. Agric. Ireland 19: 209–214. 1919.—Gives directions for changing cultivated land to hay or pasture land. Considers previous cropping, seed selection, preparation of soil, and later treatment.—*Donald Folsom.*

195. Anonymous. **Field experiments, 1918.** Jour. Dept. Agric. Ireland 19: 180–208. 1919.—Summarizes experiments conducted in all parts of Ireland from 1901 to 1918 and concerned with: (1) potatoes (*Solanum tuberosum*) in regard to manure and artificial-fertilizer requirements, the use of peaty soils and seaweed fertilizer, the sprouting and importation of seed tubers, and the comparison of varieties; (2) mangels (*Beta vulgaris*) and turnips (*Brassica campestris*) in regard to manure and artificial-fertilizer requirements, the use of peaty soils, and the comparison of varieties; (3) oats (*Avena sativa*) in regard to artificial-fertilizer requirements, the use of peaty soils, and the comparison of varieties; and (4) wheat (*Triticum sativum*) in regard to the comparison of varieties in 1918 and the control of bunt by means of copper sulphate.—*Donald Folsom.*

196. Bailey, Herbert S. **The production and conservation of fats and oils in the United States.** U. S. Dept. Agric. Bull. 769. *48 p.* 1919.—An account of the sources, methods of extraction, and uses of cottonseed oil, olive oil, peanut oil, coconut oil, palm kernel oil, palm oil, corn oil, soy bean oil, linseed oil, castor oil, lard, tallow, butter and cheese, fish oils, and other vegetable and animal products. Tables are given showing the yearly production, importation, and exportation of various fats, oils, and their derivatives in the United States from 1912 to 1917, and the monthly production from January to June, 1918. Methods of conserving and increasing the supply of these products are discussed. Emphasis is placed upon the increasing use of vegetable oils in place of certain animal fats, and the substitution of less well-known oils for those difficult to obtain. A new hydrogenation process "makes it possible not only to produce hard fats from liquid oils, but also to convert oils formerly considered inedible into sweet, white, perfectly wholesome products."—*L. W. Sharp.*

197. Jordan, W. H. **Director's report for 1918.** New York Agric. Exp. Sta. [Geneva] Bull. 457. *25 p.* 1918.—See Bot. Absts. 3, Entry 856.

198. Federal Horticultural Board. U. S. Dept. Agric. **Amendment No. 1 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements 60: 21–22. 1919.—See Bot. Absts. 2, Entry 1294; 3, Entry 399.

199. Scofield, C. S., T. H. Kearney, C. J. Brand, O. F. Cook, and W. T. Swingle. **Production of American Egyptian Cotton.** U. S. Dept. Agric. Bull. 742. *30 p.* 1919.—Egyptian cotton is described as having a fine, very strong, long staple fiber, used in the manufacturing of sewing thread, hosiery, automobile tire fabrics, and fine and fancy dress goods. Practically all Egyptian cotton used heretofore in the United States has been imported from Egypt, the annual importations during the past ten years having been over 180,000 bales of 500 pounds each. The production of this type of cotton in the United

States has grown from 375 bales in 1912 to 16,000 bales in 1917 under the direction and stimulation of the U. S. Department of Agriculture. Egyptian cotton grown in the United States is as good as the best cotton grown in Egypt. The chief difficulties in the production of this cotton in the United States are (1) lack of reliable seed stock, and dependable varieties, (2) lack of coöperation on part of growers in order that a sufficient quantity may be grown to establish standards and be of commercial importance. Cultural methods, diseases, and requirements of the crop are also considered.—*R. G. Wiggans.*

200. Piédallu, André. **Sur l'importance du sorgho sucré. [Importance of sweet sorghums.]** Compt. Rend. Acad. Agric. France 30: 1091–1095. 1917.—Brief notes on the history and uses of this crop. [See also following Entry, 201.]—*C. V. Piper.*

201. Dybowski, M. J. **Sur l'importance du sorgho sucre. [Importance of sweet sorghums.]** Compt. Rend. Acad. Agric. France 30: 1075–1077. 1917.—Introductory reference to paper by André Piédallu. [See also preceding Entry, 200.]—*C. V. Piper.*

202. Vilmorin, J. de and A. Meunissier. **Le blé et sa culture en France. [Wheat and its culture in France.]** Rev. Gen. Sci. Pur. et Appl. 29: 691–706. *Fig. 1.* 1918.—This essay briefly discusses wheat as to its history, species, varieties, and their origin, breeding, temperature relations, diseases and particularly methods to improve the average yield in France both in quantity and quality.—*C. V. Piper.*

203. Vilmorin, Jacques de **Essais et observations sur les blés a Verrieres en 1917. [Trials and observations on wheats at Verrieres in 1917.]** Compt. Rend. Acad. Agric. France 30: 1077–1086. 1917.—Records of 7 varieties of spring wheat in regard to relative earliness and yielding capacity; also the days required for each to mature when planted March 1, March 15, April 1 and April 15. In addition notes are given on the relative winter injury to 73 varieties of winter wheat.—*C. V. Piper.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

204. Coulter, John M. **The botanical work of the National Research Council.** School Sci. Math. 19: 234–236. 1919.—Abstract.

205. Drushel, J. Andrew. **A plan for studying pines.** Nat. Study Rev. 15: 6–8. 1919.

206. Ullrich, Fred T. **Course in agriculture for a four year high school.** School Sci. Math. 19: 214–227. 1919.

207. Woodhead, T. W. **Academic botany and the farm and garden.** New Phytol. 18: 50. 1919.—This is a contribution to a symposium on "The reconstruction of elementary botanical teaching." [See also three following Entries, 208, 209, 210.]—*I. F. Lewis.*

208. Blackman, V. H. **On some aspects of the plea for reconstruction.** New Phytol. 18: 50–56. 1919.—See also next preceding and two following Entries, 207, 209, 210.

209. Oliver, F. W. **"No department the door of which should not be opened."** New Phytol. 18: 56–58. 1919.—See also two preceding and next following Entries, 207, 208, 210.

210. Blackman, F. F. **What is botany?** New Phytol. 18: 58–64. 1919.—See also three preceding Entries, 207, 208, 209.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

211. Fischer, Cecil E. C. Forest grazing and the Nellore "Kancha System." Indian Forester 44: 531–537. Nov., 1918.—Cattle have severely injured the forests in the Nellore district, and regulations provide certain blocks to be grazed under lease, a deferred system being used. The aim is for communal grazing and communal forest protection. The conflict of grazing and forestry is recognized, and areas are divided into forests and fuelwood areas, and grazing lands. On the latter, all the timber of value will be removed and logging will be done to encourage forage and to discourage forest reproduction. By these operations, it is hoped to evolve pure grazing areas studded with shelter trees, and capable of supporting more cattle than at present. [Through Abst. in: Agric. Jour. India. 1918: 95–101. 1918.]—*E. N. Munns.*

212. Lee, Y. K. [Chinese.] The relationship of forestry to farming. Khu-Shou [Science, a publication of the Science Society of China.] 4: 43–47. 1918.

213. McCarthy, Edward F., and Raymond J. Hoyle. Production of pulp on balsam lands. Paper 23^7: 14–18. Oct. 23, 1918.—Data on a stand of balsam in the southern Adirondacks, which shows accelerated growth for period of five decades. All growth data are arranged by age classes. Includes stand tables from samples and plot study of same area, also two other stand tables from caliper records on swamp type in Adirondacks. Amount of reproduction per acre under virgin stand is shown in a table.—The study is chiefly interesting as a suggestion of what will occur on swamp lands if fire is kept out. Authors predict "that these lands may be expected to produce a cord of pulp per acre per year without excessive care."—*Edward F. McCarthy.*

214. Purvis, J. E. The conversion of saw-dust into sugar. Proc. Cambridge [England] Phil. Soc. 19: 259–260. 1919.—Varying quantities of sawdust from ordinary deal, digested with different acids of varying concentrations yield varying quantities of sugar, depending on the nature of the acid, its strength relative to the amount of sawdust used, and the length of digestion.—*Michael Levine.*

215. Schwab, W. G. The forests of Tazewell County, Virginia. Office of State Forester, Bull. 18. *14 p., 6 plates, 1 folded map.* 1917.—These three counties are all in the extreme southwestern part of the state, among the mountains, and contain a large amount of forest. Taking the three together, the most important trees are several species of *Quercus*, *Liriodendron tulipifera*, and *Castanea dentata*. The illustrations are from photographs showing the various forest types and conditions of exploitation.—*Roland M. Harper.*

GENETICS

George H. Shull, *Editor*

216. Allard, H. A. Gigantism in Nicotiana tabacum and its alternative inheritance. Amer. Nat. 53: 218–233. May–June, 1919.—Work of previous investigators on gigantism in Nicotiana is reviewed and the independent origin of several different strains of mammoth plants recorded. Giant or mammoth plants have appeared suddenly in commercial plantings of the Sumatra, Maryland, Cuban and Connecticut Havana types of *Nicotiana tabacum*. They also occur in varietal crosses of these types and are reported by the author in progeny of a species cross between *Nicotiana tabacum* and *Nicotiana sylvestris*.—These giant plants are found to differ from the varietal type only in height and number of leaves. One of these plants reached a height of nearly 5 meters and developed 123 leaves. The giant habit of growth with its increased vegetative vigor delays blossoming to such an extent that seed can be obtained only by transplanting the plants to the greenhouse.—Author gives analysis of

1812 F_2 plants of many different varietal and species crosses showing that the giant habit behaves as a simple Mendelian character recessive to the normal form. First generation hybrids between giant and normal plants always flower naturally in the field though the number of leaves is greater than on homozygous normal plants. Intermediate forms have been found to arise in some progenies. These intermediates behave as hybrid forms in that their progeny produce a certain percentage of typical mammoth non-blossoming types.—*J. H. Kempton.*

217. Allard, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of Nicotiana rustica.** Amer. Nat. 53: 234–238. May–June, 1919.—A light, yellowish green type of *Nicotiana rustica* with white stems and midribs, resembling in these respects the White Burley variety of *Nicotiana tabacum*, has been designated "*aurea*."—First generation plants of a cross between this *aurea* type and a green type of same species were all green. In second generation of 25,000 plants, 24.31 per cent were of *aurea* type. Extracted *aurea* plants breed true. Some extracted green plants breed true, while others again segregate into green and *aurea* plants. Back crosses of heterozygous plants with dominant green type give only green plants in first generation while back crosses between heterozygous plants and recessive *aurea* type produce approximately equal numbers of green and *aurea* plants.—The *aurea* plants are so distinct that they can be definitely classified four or five weeks after germination, making it possible to grow large populations. For this reason and in view of the remarkably uniform Mendelian behavior author suggests that this cross is especially favorable for demonstration of simple Mendelian behavior in all its phases.—*J. H. Kempton.*

218. Andrews, A. Leroy. **Bryological notes. IV. A new hybrid in Physcomitrium.** Torreya **18**: 52–54. 1918.—See Bot. Absts. **2**, Entry 195.

219. Anonymous. **Disease and natural selection.** Jour. Heredity **9**: 374. Dec., 1918.—Extracts from report of H. C. and M. A. Soloman, Mental Hygiene, Jan., 1918. Statistics on syphilitic families, indicating high correlation between morality and total net offspring. —*Merle C. Coulter.*

220. Anonymous. **Further evidence that "like marries like."** Jour. Heredity **9**: 378–379. Dec., 1918.—Quoted from Donald M. Marvin, in the Publications of the American Statistical Association: "Marriage obeys the sweeping but silent force of propinquity, which is especially potent in determining mate selection." In test samples reported by the United States Census, of a thousand women who married, 541 worked; of these 275 married men of the same occupation. Of a thousand men more than 25 per cent married into their own occupation. —*H. H. Laughlin.*

221. Anonymous. **Some present aspects of immigration.** Jour. Heredity **10**: 68–70. Feb., 1919.

222. Anonymous. **Heredity of cancer.** Jour. Heredity **10**: 89. Feb., 1919.

223. Anonymous. **Better dairying by bull associations—joint use of good sires improves herds.** Jour. Heredity **10**: 135. Mar., 1919.

224. Anonymous. **Variation, selection and mutation in one of the protozoa.** Jour. Heredity **10**: 143. Mar., 1919.

225. Anonymous. **Families of the first born.** Jour. Heredity **10**: 160. Apr., 1919.

226. Anonymous. **Develops new hybrid cowpeas.** Jour. Heredity **10**: 175. Apr., 1919.—See Bot. Absts. **3**, Entry 972.

227. Anonymous. **Inheritance of continuous and discontinuous variations.** Jour. Heredity **10**: 191. Apr., 1919.

228. Anonymous. **Inheritance of characters in the culinary pea.** [Rev. of: White, O. E. Studies of inheritance in Pisum. II. The present state of knowledge of heredity and variation in peas. Proc. Amer. Phil. Soc. 56: 487–588. 1917.] Gard. Chron. 65: 230. May 10, 1919.

229. Bateson, W. **Studies in variegation. I.** Jour. Genetics 8: 93–99. *Pl. 3–4, 1 fig.* Apr., 1919.—See Bot. Absts. 3, Entry 594.

230. Becking, L. G. M. Baas. **Some numerical proportions in panmictic populations.** Rec. Trav. Bot. Neérland. 15: 337–366. *1 pl.* 1918.—As Hardy, Pearson, Jennings, and others. pointed out, the population $R\,AA + S\,Aa + T\,aa$ will remain constant in its proportions after a number of random matings. Pearson's "Law of ancestral heredity" as applied to Mendelian populations is based upon this fact only. Now, Pearson's Law cannot be generalized. As writer points out a population with random mating (so-called panmictic population) does *not* remain constant in its proportions if there are two or more than two genotypic differences. Formulae for the different constituent groups are easily derived. Writer has done so for a digene population. The formulae obtained give rise to many particular consequences. In the first place we can prove that the population reaches a limiting value after a great number of generations, the homozygotes being proportional in pairs. This limiting population remains constant in its constitution. The constitution of the original population is of no influence on that limiting form. These qualities are also true for populations with more than two genotypic differences.—In the second place it is easily proved that if the homozygotes. are equal in pairs, they will be all equal to each other after a great number of generation : Thirdly: if in a certain population the number of the homozygotes : mono-heterozygotes : di-heterozygotes : n-heterozygotes $= 1 : 2 : 2^2 : 2^n$, that population will be constant in its constitution. The formulae are treated also geometrically, this method demonstrating clearly the fact that all populations will reach the same limiting value. It seems of importance to take wild populations (*e.g.*, endemic populations on small islands) as an object of inquiry to test the value of the formulae. If there is panmictic mating in that population, there must exist certain numerical relations between the different genotypic constituents. The random mating, being the most general case of syngamy, thus offers a good starting point for mathematical investigation of Mendelism.—*L. Baas Becking.*

231. Best, Harry. **The blind: their condition and the work being done for them in the United States.** *20 × 15 cm., xxi + 763 p.* Macmillan Co.: New York. 1919.—Comprehensive treatise in which chapter 7 (p. 126–154) deals with "Blindness and heredity." From census of 1910 it is found that 24.1 per cent of all blind have near relatives who are also blind. Similar results are also presented from reports of various schools for the blind. Analysis of causes of hereditary blindness indicates that they are for most part specific affections of the eye. Most notable of these is cataract, of which there are several different hereditary forms. Other diseases having strong hereditary tendencies are glaucoma, retinitis pigmentosa, detachment of the retina, one form of atrophy of optic nerve, etc. A number of diseases which occasionally result in blindness, also show marked influence of heredity. Author considers effect of marriage of blind *inter se.* Quotes census report showing that blindness is handicap to marriage, the proportion of married among the blind 15 years old or over being about 89 per cent of normal. This handicap is especially effective when blindness occurs before age of 20 years. Data on marriage between two blind persons are not available in census reports but direct inquiry indicates presence of several hundred couples in United States of America, who were both blind at time of marriage. On very limited information concerning these families, conclusion is reached that two blind parents do not necessarily have more blind children than a mating between a blind and a normal person. This statistical result is explained on basis of fact that blindness is result of many independent causes, so that in matings between two blind persons there is still no case in which both parents are blind for same cause.—In some families consanguineous marriages considerably increase proportion of blind progeny while in other families no such result is found. Advocates eugenical laws and education directed toward the elimination of diseases which are known to be correlated with hereditary blindness.—*G. H. Shull.*

232. Blakeslee, A. F. **A unifoliolate mutation in the Adzuki bean.** Jour. Heredity 10: 153–155. *Fig. 2.* Apr., 1919.—See Bot. Absts. 3, Entry 980.

233. Brierly, W. B. **Experimental studies in the specific value of morphological characters in the fungi.** Proc. Linnean Soc. 1918: 55–56. 1918.

234. Broderick, F. W. **Hardy apples and plums for the Canadian Northwest.** Minnesota Hortic. 46: 393–399. *1 pl., 1 fig.* Nov. 1918.—Discussion of development of hardy apples and plums for Canadian northwest. Mention is made of the results of prominent horticulturists in work. A list of most promising apple and plum varieties is included. Crosses of hardy standard varieties with *Pyrus baccata* proved to be hardy. In the plum, selections were made from native wild seedlings. In general three methods have been used in obtaining hardy varieties: crossing hardy varieties and selecting the best seedlings; selections of best types from the wild; and importation.—*M. J. Dorsey.*

235. Castle, W. E. **Piebald rats and the theory of genes.** Proc. Nation. Acad. Sci. U. S. Amer. 5: 126–130. *1 fig.* Apr., 1919.—Two conceptions of heredity are contrasted. "Unit-characters" (character differences acting as units in heredity), may show variation, as result of crossing or of selection. This indicates that the hereditary unit varies. On other hand it is supposed that hereditary unit, gene, is invariable, except for rare and sudden changes, mutations, and that variation in character is due to recombinations of other genes, modifiers. Hooding character in rats acts as recessive unit difference from self, but shows great hereditary variation. Plus-selected race with mean grade of + 3.73 and standard deviation of 0.36 was thrice crossed and extracted from wild self. Mean grade was reduced to + 3.04 with standard deviation of 0.64. Minus-selected race with mean grade of − 2.63 and standard deviation of 0.27 was thrice crossed and extracted from wild self. Mean grade was raised to + 2.55 (in one family of 14 hooded to + 3.05) with standard deviation of 0.66. Standard deviation was high at first extraction and somewhat reduced at third. These facts indicate that the variability of the hooded character is due to residual heredity or modifying factors rather than to changes in hooded gene proper.—*P. W. Whiting.*

236. Castle, W. E. **Siamese, an albinistic color variation in cats.** Amer. Nat. 53: 265–268. May–June, 1919.—Complete albinism occurs in rats, mice, and rabbits. Partial albinism of "Himalayan" type occurs in guinea-pigs and rabbits, of "red-eyed" and "dilute" types in guinea-pigs, and of "ruby-eyed" type in rats. Genetic locus for albinism is probably homologous in different rodents. "White-spotting" and "pink-eye" are not allelomorphic with albinism. Blondism in man may, according to Wright, be partial albinism. Partial albinism acts as recessive, is more pronounced in young, reduces pigment in eye, and tends to suppress or eliminate yellow pigment in coat. Siamese dilution in cats has these characteristics except that it is not completely recessive. Doctor in England furnishes data in reference to crosses with other strains. First generation animals from black are almost black, but incline toward seal brown as in ears of Siamese. Other crosses produce white or yellow spotting according to expectation. Siamese voice and "cross-eyes" are more or less dominant. An F_1 female crossed to pure Siamese gave three Siamese pure in all respects. Other types were not mentioned. "Blue-pointed" Siamese were obtained, presumably from crosses with maltese. Siamese, as far as reported, is always non-agouti. Agouti forms could probably be obtained by crossing to tabby.—*P. W. Whiting.*

237. Cole, Leon J., and Frank J. Kelley. **Studies on inheritance in pigeons. III. Description and linkage relations of two sex-linked characters.** Genetics 4: 183–203. Mar., 1919.—See Bot. Absts. 3, Entry 2102.

238. Collins, G. N. **A fossil ear of maize.** Jour. Heredity 10: 170–172. *Fig. 7.* Apr., 1919.—See Bot. Absts. 3, Entry 984.

239. Collins, G. N. **Intolerance of maize to self-fertilization.** Jour. Washington [D. C.] Acad. Sci. 9: 309–312. June 4, 1919.—See Bot. Absts. 3, Entry 607.

240. Conklin, Edwin G. **Heredity and democracy. A reply to Mr. Alleyne Ireland.** Jour. Heredity **10**: 161–164. Apr., 1919.—See Bot. Absts. 3, Entry 984.

241. Connors, C. H. **Methods in breeding peaches.** Proc. Amer. Soc. Hortic. Sci. **14**: (1917) 126–127. 1918.—See Bot. Absts. 2, Entry 724; 3, Entry 608.

242. Crandall, C. A. **Apple bud selection: Apple seedlings from selected trees.** Illinois Agric. Exp. Sta. Bull. **211**: 181–264. *43 fig.* 1918.—Object of this experiment, begun in 1907, was (a) to determine, for purposes of propagation, whether there are differences between large and small buds, between buds produced on different parts of the tree and, (b) to determine what differences there are, if any, between seedlings grown from seed taken from large fruit as compared with those from small fruit borne on same tree. Bud selection experiments were carried on extensively and with great care. Tests were made by means of buds and grafts on seedling stock of mixed apples. In seed bed and nursery there was considerable loss from various causes. The trees were planted 15 × 15 feet in the orchard. Measurement in the different selections was taken first on the terminal growths only and later on both the height and width.—Growth of scions and buds selected as noted above was remarkably similar. In each group there were fluctuations in growth, and there was considerable variation in the comparative growth from year to year. Author concludes from these extensive tests that for purposes of propagation there are no differences between buds of large and small size, between scions of small or large diameter, or between buds from different situations upon the tree. All buds from healthy shoots appeared from these experiments to be of equal value for propagation, even though each tree selected in this way had distinct individuality. As to seedlings from apples of different size, there was in all great reduction in the seed bed and nursery so that at the end of the 6 year period there was one tree for each 17.2 seeds planted. A comparison of the survival value of seedlings from the large and small fruits showed that seedlings from the former were more resistant to adverse conditions and possessed a higher degree of vitality.—*M. J. Dorsey.*

243. Darbishire, F. V. **Sugar beet seed.** Jour. Soc. Chem. Ind. Rev. **38**: 21. 1919.—See Bot. Absts. 3, Entry 2108.

244. Davenport, C. B. **Heredity of stature in man.** Jour. Heredity **9**: 295, Nov., 1918. —Stature is end result of a number of independently varying elements. Separate segments of stature are separately inheritable. Study made on 3298 children, 1738 parents and a number of relatives. Offspring of short or very short regress more toward mean than of tall or very tall, indicating that shorts may carry recessive factors for tallness, while talls are homozygous. Segments of stature such as neck, length of torso, thigh, and foreleg are inherited according to same law. Persons of extreme stature tend to marry similar persons. —*P. W. Whiting.*

245. Davenport, Charles B. [Rev. of: Downing, Elliot Rowland. **The third and fourth generation: an introduction to heredity.** *164 p.* University of Chicago Press: Chicago. 1918. (See Bot. Absts. 3, Entry 248.)] Mental Hygiene **3**: 153–154. Jan., 1919.

246. Davenport, Charles Benedict, assisted by Mary Theresa Scudder. **Naval officers; their heredity and development.** Carnegie Inst. Washington, Publ. 259. *236 p.* 1919. —Part One is devoted to an exposition of the principles of pedigree analysis, with special reference to heritable traits which contribute to success of naval officers. Method of inheritance of special traits is described, and an enumeration of the special traits involved is given. "Sea-lust, or thalassophilia, is almost wholly a male character, apparently much more so than nomadism; quite as much so as the beard. Even among the Polynesians the women are not given to going to sea." From hereditary point of view, thalassophilia is a recessive trait. Naval fighters are chiefiy hyperkinetic. In their youth they are shown to have been nomadic, thalassophilic, and adventurous.—Part Two is given up to an analysis of the biographies of sixty-eight famous naval officers, laying particular stress on their juvenile promise

and personal traits. Sixty-seven personal traits are noted, ranging from chivalry and courage, to scholarship and self-control. These are traced as they are variously segregated and recombined in the ancestry and finally appear in the propositus.—*H. H. Laughlin.*

247. Davis, Robert L. **Plant breeder's envelope.** Jour. Heredity **10**: 168–169. *Fig. 6.* Apr., 1919.—See Bot. Absts. 3, Entry 992.

248. Downing, Elliot Rowland. **The third and fourth generation; an introduction to heredity.** *164 p.* University of Chicago Press: Chicago. 1918.—One of a series of "Constructive studies" in religious education, published under auspices of Divinity School of University of Chicago. A brief popular treatment of eugenics "for young people." Contains a few plates and figures and numerous pedigree charts. Adapted to class use by questions at end of each chapter. Chapter 1, introduction. 2, Some famous pedigrees. 3, Sexual reproduction (mandrake and frog). 4, Mendel's results and explanation of same, presence and absence hypothesis, partial dominance. 5, Examples of man's achievements: origin of domestic varieties, emphasizing mutation; Jones' "yellows"-resistant cabbage; work of de Vries, Burbank, Johannsen, Nilsson; Aaronsohn's drought-resistant wheat; selection and hybridization in wheat and corn; egg-laying in chickens. 6, Physical basis of heredity, sex chromosomes. 7, Some apparent exceptions to Mendel's law; Bateson's purple sweet peas, and other examples of reversion; factor hypothesis, and coat color in rabbits; phenotype-genotype conception, and multi-hybrid ratios; Nilsson-Ehle's 15 : 1 and 63 : 1; negro-white crosses; sex-linked characters in Drosophila and man. 8, Inheritance of acquired characters: fallacy of certain supposed examples; Weismannism; transplantation of ovaries; importance of distinguishing effects of environment and heredity in man; Tower's potato beetles; Stockard's alcoholized guinea-pigs; transmission of venereal diseases. 9, Inheritance of human characters, mostly pedigrees of feeblemindedness and of royal families. 10, "The practical problem of human heredity:" ". . . young people . . . have a right to a frank, yet reverent, presentation of reproduction and heredity;" summarizes earlier chapters of book as far as they bear on eugenics; points out the danger of "survival of unfit" in America, and recommends certain general social, economic, and legal readjustments to meet this danger. [See Bot. Absts. 3, Entry 245.]—*Merle C. Coulter.*

249. Duerden, J. E. **Breeding experiments with North African and South African ostriches. IV. Increasing the number of plumes: Degeneration and restoration.** Union of South Africa Dept. Agric. Bull. 7. *39 p., 12 fig.* 1918.—See Bot. Absts. 3, Entry 2116.

250. Emoto, Y. **On the relative efficiencies of cross and self fertilization in some plants.** [Title in English, text in Japanese.] Bot. Mag. Tôkyô **32**: 153–186. *2 fig.* June, 1918.—See Bot. Absts. 2, Entry 11.

251. Frets, G. P. **(1) On Mendelian segregation with the heredity of headform in man.** Proc. Kon. Akad. Wet. Amsterdam. **20** (1917): 435–448. *7 fig.* **(2) Complicated Mendelian segregation in the heredity of headform in man.** *Ibid.* **20**: (1917): 865–874. 1918.—The significance of the shape of the head as an anthropological characteristic was brought to light by the investigations of A. Retzius. He discriminates the brachycephalic or short and round, and the dolichocephalic or long and oval skull type. The inheritance of head form has not yet been investigated methodically. E. Fischer concludes, from his hybrid material that headform is most probably hereditary according to the rules of Mendel.—These first preliminary communications relate to the results of a thousand measurements. As completely as possible all members of the families were measured. Extensive tables will be published later. The material consists of families of from one to three generations (*i.e.*, four grandparents, parents, and children). It is a question whether the Mendelian analysis of factors of heredity of shape of head can restrict itself to tracing heredity of the index. In this case, we should have to do with one pair of units, or with several (Nilsson-Ehle). If length and width Mendelize separately, we have to do either with two pairs of units or with two progressions. Both possibilities are examined. In favor of segregation plead those cases where,

with little differences in the indices of the parents, the children show great divergence of values, or if a single child has a strongly deviating index. Data show great variability and also irregularity of indices.—Proof is presented that headform is not inheritable through a single pair of allelomorphic factors. Data of different families plead for occurrence of plural factors working in the same direction in the sense of Nilsson-Ehle. So *e.g.*, those, where the indices of the children surpass those of the parents in both directions or in one direction.—Dominance may occur as shown by families of which one of the parents and almost all or most of the children are brachycephalic. There are however also families for which this is not the case. Consequently beside segregation simple dominance of brachycephaly cannot be admitted. Nilsson-Ehle's scheme of heredity gives the best explanation for the facts.—It is possible that shape of head is complex character and length and width Mendelize separately. There is however correlation of properties and a Mendelian explanation of it is given by hypothesis of coupling and repulsion of factors. With absolute coupling the two properties can be represented by one factor of heredity. It is quite possible that for the heredity of shape of head, coupling occurs between factors for length and those for width. This means consequently that in general shape of head can be conceived as one single series of Mendelian characters, but that in some cases deviations will be found, which are the consequence of the meeting of gametes of very rare independent factors for length and width. Further investigation of material shows that brachycephalic head-form has not always same behavior in heredity. The brachycephaly may be effect of shortening or of widening of the head. It appears that the brachycephalic, large and wide head is often dominant, while the brachycephalic, small and short head is often recessive to dolichocephalic head-form. It is possible, that for formation of short, small head, the meeting of two factors is necessary. The material given here cannot yet prove this conception.—Broad lines of Mendelism are to be recognized; there are distinct indications of segregation and of independency of factors. With regard to nature and number of the factors of heredity, the phenomena of segregation are too much complicated, to be explained by one pair of factors. Therefore the data are tested by the scheme of heredity of Nilsson-Ehle.—*F. P. Fretz.*

252. Freud, Sigmund. **Three contributions to the theory of sex.** *3d. revised ed., 117 p.* Nerv. and Ment. Dis. Pub. Co.: Washington [D. C.]. 1918.—See Bot. Absts. 3, Entry 996.

253. Harland, S. C. **Tomato breeding in St. Vincent.** Agric. News, Barbados **17**: 4-5. 1918.—See Bot. Absts. 2, Entry 519.

254. Harland, S. C. **Inheritance of certain characters in the Cowpea (Vigna sinensis).** Jour. Genetics **8**: 101–132. *1 fig.* Apr., 1919.—See Bot. Absts. 3, Entry 1003.

255. Harper, R. A. **The evolution of cell types and contact and pressure responses in Pediastrum.** Mem. Torrey Bot. Club **17**: 210–240. *27 fig.* 1918.—See Bot. Absts. 2, Entry 61.

256. Hastings, G. T. **Some abnormal poplar flowers.** Torreya **18**: 16–18. *4 fig.* 1918. —See Bot. Absts. 2, Entry 291.

257. Hegner, R. W. **Heredity, variation, and the appearance of diversities during the vegetative reproduction of Arcella dentata.** Genetics **4**: 95–150. *27 fig.* Mar., 1919.

258. Hendrickson, A. H. **Five years results in plum pollination.** Proc. Amer. Soc. Hortic. Sci. **15** (1918): 65–66. 1919.—See Bot. Absts. 2, Entry 727; 3, Entry 635.

259. Holzhausen, A. **Laeliocattleya suecica nov. hybr. (LC. Myrra × Pallas).** Svensk Bot. Tidskr. Stockholm **13** (part 1): 97–99. 1919.—Author has secured hybrid plants from *Cattleya remula* × *C. labiata*, *C. labiata* × *C. Mrs. Pitt*, *C. Trianaei* × *C. nobilis* and *Laeliocattleya Myrra* × *LC. Pallas*.—The last combination has now flowered and is named *Laeliocattleya suecica*. The parents are also hybrids. *Laeliocattleya Pallas* is *Laelia crispa* × *Cattleya Dowiana* and *Laeliocattleya Myrra* is *Laelia* flava × *Cattleya Trianaei*. A photograph of a flower from the plant in question is reproduced.—*K. V. Ossian Dahlgren.*

260. Hunter, Capt. H. The improvement of the barley crop. Jour. Dept. Agric. Ireland 19: 139–159. *Fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 636.

261. Ireland, Alleyne. Democracy and the accepted facts of heredity. Jour. Heredity 9: 339–342. Dec., 1918.—A plea for hereditary autocracy in government, based upon principle of inheritance of leadership and genius. Close analogy is maintained between struggles for leadership and success of the race in species of plants and animals on the one hand and man on the other.—*H. H. Laughlin.*

262. Key, Wilhelmine E. Better American families. Jour. Heredity 10: 11–13. Jan., 1919.—A short essay on the nature of social progress and its relation to good blood. The most virile stock of Devon and Somerset is traced through Massachusetts Bay and thence to the old Northwest, evidence of social heritage being measured by the response of men of higher order to the wars of their times. Similarly the persistence of degeneracy is named in the Jukes, Ishmaelites and Kallikaks.—*H. H. Laughlin.*

263. Kiessling, L. Einige besondere Fälle von chlorophylldefekten Gersten. [Several special cases of barley defective in chlorophyll.] Zeitschr. indukt. Abstamm. Vererb. 19: 160–176. June, 1918.—Briefly reviews earlier studies on genetics of plant characters involving such chlorophyll defects as albino and yellow foliage. In numerous cases cited from literature, heterozygote of green foliage × either albino or yellow foliage is green-leaved, demonstrating absolute dominance of former. Finds in genetic studies on *Hordeum distichum* L. *nutans* Schübl. three types of foliage variations involving chlorophyll defects, similar to those cited from literature, which from their behavior in experimental cultures, are similar to DeVries's "Zwischenrassen" (half races, ever-sporting varieties). The first discussed type arose in a hybrid green-leaved strain in which the ancestral plants had had their unopened flower buds injected with a solution of potassium nitrate. Other plants similarly treated gave no such variations. The variation consisted of plants with entirely white (albino) or white-striped foliage. A detailed discussion of its inheritance is given. Two entirely green-leaved plants gave rise the following season to three classes of offspring—green-leaved, striped-leaved, and white- or albino-leaved—in proportions approximating a Mendelian ratio of 12 : 3 : 1 (provided all seed planted grew and those unrepresented when the first observations were made are regarded as albinos). Most of the pure albinos died very soon after germination. One striped-leaved plant of the same origin as the two green-leaved plants mentioned above produced the following season only striped-leaved and albino progeny in proportions approximating a Mendelian ratio of 3 : 1. These ratios suggested a Mendelian two-factor interpretation of the data—one factor for green foliage, and one for striped leaves, the former being dominant. In the absence of the first, the progeny are striped. In the absence of both, albinos result. However, a series of observations made at intervals over a 38-day period on these plants necessitated changes in classification, since all the albinos actually observed either died or later became striped with green. Those classified as green remained unchanged. The expression of striped in the same plant also varied much from time to time. Several hundred seed from the green and white-green striped classes were sown, resulting in still more complex results. Seed from striped plants gave both striped and albino plants, while that from green plants gave green: striped or green: striped and albino in various proportions. No green bred true. Literature on striped and albino foliage variations is discussed in detail.—The second type of variation consisted of shoots with albino and striped leaves arising as a bud sport from a normal green-leaved plant which insects had injured. Efforts to obtain such results again from this and other cultures by various types of mechanical injury were unsuccessful.—The third type of chlorophyll defect studied consisted of a light yellow (not golden yellow)-leaved mutation which for the most part bred true in large cultures. It had fewer chloroplasts per cell and larger leaves than the normal green-leaved form. The few variant plants in these mutant cultures had various kinds of chlorophyll defects such as striped light and dark yellow leaves, white and yellow striped leaves, etc.—*Orland E. White.*

264. Kirkham, William B. **The fate of homozygous yellow mice.** Jour. Exp. Zoöl. **28:** 125–135. *2 fig.* May 20, 1919.—In prenatal life of animals two crises occur, one at implantation and one at parturition. Latter is apparently not significant in fate of homozygous yellow mice as the dead young would have been observed if they occurred in anything like the expected number. Mouse ovum has food enough to maintain itself up to blastula stage. Factors are here relatively stable. Much less stable set of factors governs implantation for cleaving ova and blastulas of white mice average over seven per pregnant animal while number of young in litters average less than five. After implantation development is almost always normal up to birth, in mice of all colors. As regards implantation, two sets of factors exist, maternal and embryonic. Corpora lutea stimulate proliferation of uterine mucosa, a necessary antecedent to implantation of blastulas. Mouse blastula stimulates further swelling of uterine connective tissue and dissolution of this along with the epithelium, thus supplying food to embryo. Lactation inhibits both sets of stimuli. Various factors may explain failure of some blastulas to implant in white mice. Time of ovulation from last parturition, time of fertilization, rate of cleavage, and time of implantation is same for all embryos, whites, homozygous yellows and heterozygous yellows, showing that eggs with yellow factor undergo maturation and fertilization even when entered by yellow-bearing sperm. Abnormalities of homozygous yellow appear first in morula. At implantation they plasmolyze and are phagocytized, but nevertheless effect uterine changes, thus differing from abnormal embryos of non-yellow mice. There is in addition to parental abnormality (tendency in yellow of both sexes to fatness and sterility at early age) an inherent weakness in homozygous yellow embryos. It may be possible to transplant ovaries of yellow to non-yellow and thus to obtain homozygous yellow offspring by avoiding abnormal maternal factors. Proportion of degenerate embryos from yellow by yellow is 29+ per cent, very close to Mendelian expectation. —*P. W. Whiting.*

265. Küster, Ernst. **Ueber Mosaikpanaschierung und vergleichbare Erscheinungen. [On mosaic variation and comparable phenomena.]** Ber. Deutsch. Bot. Ges. **36:** 54–61. 1918. —Mosaic pattern is of very common occurrence among plants. When spots are large they are called marbled, but dotted or pulverulent if spots are very small. Not only absence of chlorophyll but also absence of anthocyan may give rise to mosaic pattern (e.g., *Coleus hybridus* hort.). Shape of the spots, their sharp limitation and often also arrangement of their cells suggest that they took their origin from one initial cell, which in turn arose by an unequal division. There are two different ways in which such an unequal division can be imagined to take place. In agreement with ideas of Weismann one daughter cell might be deprived of a certain part of the protoplasm or nuclear substance, in which case the cell will never be able to show again the lost qualities. Or the daughter cells might differ only in a physiological sense, not in a morphological one, reacting in a different manner to external influences, in which latter case reversion may be involved. Writer believes that divisions of first type have been recorded among Protista, whilst divisions of the second type occur, *e.g.*, when mutants are produced in cultures of bacteria, which afterward show regressions to the mother type. As to the phenomena of mosaic variegation he assumes that the unequal divisions are of the second type and thinks possible that within white spots, green tissue might reappear.—*K. Boedyn.*

266. Lehmann, Ernst. **Ueber reziproke Bastarde zwischen Epilobium roseum und parviflorum. [On reciprocal crosses between Epilobium roseum and E. parviflorum.]** Zeitschr. Bot. **10:** 497–511. *7 fig.* 1918.—Author crossed *E. parviflorum* with *E. roseum* in both directions and obtained two wholly different hybrids, the first of which he called "*E. rigidum,*" the second "*E. curvatum.*" *E. curvatum* is an intermediate type, with some resemblance to *E. parviflorum,* whilst *E. rigidum,* a more sterile type than *E. curvatum,* looks rather like *E. roseum.* According to the fact that in *Epilobium* unlike reciprocal hybrids were discovered this genus becomes of great interest especially in connection with recent researches on *Oenothera.*—*K. Boedyn.*

267. LOTSY, J. P. **Over de mogelijkheid van intranucleaire kruising bij homozygoten.** [**On the possibility of intranuclear crossing in homozygotes.**] Genetica 1: 92–97. *10 fig.* Jan., 1919.—Author shows that when in reduction-division, the chromosomes, combined into a thread, are parting again, there is a certain hypothetical possibility of "chromosome-crossing." Normally the thread breaks up into same pieces (chromosomes) which were united in the dividing nucleus, but it might happen that one chromosome carry with it a chromomere of the chromosome with which it was united. Thus normal chromosomes A, B, C would become by this process A+, B−, C. The gamete which contains this new set of chromosomes will very probably unite with a normal one giving a hybrid with exactly the same number of identical chromomeres as the homozygous plants, only combined in this way: AA+ BB− CC. This hybrid plant would appear exactly like the homozygous plants but would produce four classes of gametes: ABC, AB−C, A+BC, and A+B−C. When selfed F_2 plants will be as follows: 6 plants with same number of chromomeres; 4 plants with one chromomere less than normal; 4 plants with one chromomere more than normal; 1 plant with two chromomeres less than normal (recessive mutant); 1 plant with two chromomeres more than normal (progressive mutant). Both recessive and progressive mutant when crossed with normal will segregate in F_2 in 3 : 1 ratio. Author thinks this is in fair accord with cases in which mutants arise in pure strains. There is no formation of genes in the progressive mutant and thus no mutation as the process is understood by De Vries. Author remarks that crossing of individuals is also necessary for production of new types. Organisms having only non-sexual propagation have no mutative power in this way.—*H. N. Kooiman.*

268. LOTSY, J. P. **Bestendige Bastaardes.** [**Constant hybrids.**] Vereeniging tot bevordering van wet. teelt 1918 (No. 10): 1–42. 1919.—Chiefly a more popular presentation of matter in author's article on De Oenotheren als kernchimeren [The Oenotheras as nuclear chimeras] [See Bot. Absts. 3, Entry 52], but differs in that author accepted the existence of chromomeres within the chromosome in the mentioned paper while in present paper the chromosome is treated as an indivisible unit.—At the end he discusses origin of sex and of bisexual animals in normally unisexual species in connection with knowledge of the so-called X and Y chromosomes.—*H. N. Kooiman.*

269. MACCAUGHEY, VAUGHAN. **Race mixture in Hawaii.** Jour. Heredity 10: 41–47. Jan., 1919.—Asiatics comprise nearly three-fifths of the population of Hawaii, Polynesians less than one-fifth, pure Hawaiians only about one-tenth, mixed Caucasian-Hawaiians and Chinese-Hawaiians about another tenth. In Hawaii Japanese marry only Japanese, but only a little more than half of the Chinese men marry Chinese wives. In general race mixture is proceeding at a rapid rate. The article is accompanied by five tables giving statistics in reference to race and marriage. The analysis includes not only pure races, but the marriages of persons of mixed blood.—*H. H. Laughlin.*

270. MAXON, WILLIAM R. **A new hybrid Asplenium.** Amer. Fern Jour. 8: 1–3. 1918.—See Bot. Absts. 2, Entry 344.

271. MEADER, PERCY D. **Variation in the diphtheria group.** Jour. Infect. Diseases 24: 145–157. 1919.

272. MENDIOLA, NEMESIO BLANCO. **Variation and selection within clonal lines of Lemna minor.** Genetics 4: 151–182. *6 fig.* Mar., 1919.—See Bot. Absts. 3, Entry 1015.

273. MEYER, ADOLF. **The right to marry; what can a democratic civilization do about heredity and child welfare?** Mental Hygiene 3: 48–58. Jan., 1919.—See Bot. Absts. 3, Entry 2172.

274. MURBECK, SV. **En säregen blomanomali hos Capsella bursa-pastoris.** [**Abnormal flowers in Capsella bursa-pastoris.**] [Swedish, with German summary.] Ark. Bot. 15 (No. 12): 1–8. *1 fig.* July 25, 1918.—A very large individual of *Capsella bursa-pastoris* was found

in 1897 near the town of Norrkoping (Sweden) and is now in the botanical museum of Lund. Petals are absent and stamens seem to be numerous. By close study it is seen that small accessory flowers often consisting of only stamens have taken the place of all the four petals. Especially in the lower parts of the inflorescences, are often found more or less petaloid parts as traces of nectaries. Sometimes also a flower-stalk is developed. Sepals and gynoecium have not been found in these accessory flowers. Author supposes that these flowers have grown out from new points of vegetation in the axils of the petals and in close connection with the same. Most organs of the accessory flowers are developed from these new growing-points, but at least one of the outside ones is supposed to be grown out from the petal initial. —*K. V. Ossian Dahlgren.*

275. Murray, J. G. **Relation of the supplying ovary to the causation of sex.** Johns Hopkins Hosp. Bull. **29**: 275–278. 1918.—See Bot. Absts. 3, Entry 654.

276. Norton, J. B. S., and C. E. Leathers. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull. **216**: 175–226. 1918.—See Bot. Absts. 1, Entries 628 and 747; 2, Entry 730; 3, Entry 656.

277. Olson, P. J., C. P. Bull, and H. K. Hayes. **Ear-type selection and yield in corn.** Minnesota Agric. Exp. Sta. Bull. 174. *60 p., 9 fig.* 1918.—This is an investigation of the relation of various characteristics of the seed ear to its yielding qualities. The study includes such score-card points as length, weight, circumference, shelling percentage, perfection of butts and tips, kernel uniformity, variety, character, and maturity. Two methods of experiment were employed: 1, analyzing the data obtained from ear-to-row breeding plots; 2, selecting diverse types of ears and comparing their yields. Work by former method includes three different varieties of corn grown at four different locations and tests by latter method ran through three successive seasons. A critical study of all the results fails to show any significant relation between these ear characters and yield.—*L. H. Smith.*

278. Plough, Harold H. **Linear arrangement of genes and double crossing over.** Proc. Nation. Acad. Sci. [U. S. A.] **5**: 167–168. May, 1919.—See Bot. Absts. 3, Entry 659.

279. Popenoe, Paul, and Roswell H. Johnson. **Applied eugenics.** *14 × 20 cm., v + 459 p., 46 fig.* Macmillan Co.: New York, Oct., 1918.—General text-book on the subject of eugenics, presenting a discussion of the principles and investigations in this field. Considerably more attention is paid to the social forces controlling racial fortunes than to the method of inheritance of specific traits. The relation between eugenics and specific social reforms is discussed in considerable detail. Especially valuable are the chapters on the "Improvement of sexual selection" and "Increasing the marriage rate of the superior."—*H. H. Laughlin.*

280. Porter, William C. **Huntington's chorea; a report of a family history study made in Dutchess and Putnam counties, New York.** New York State Hosp. Quart. **4**: 64–74. Nov., 1918.—See Bot. Absts. 3, Entry 2179.

281. Preiser, Samuel A., and Charles B. Davenport. **Multiple neurofibromatosis (von Recklinghausen's disease) and its inheritance: with description of a case.** Eugenics Rec. Office Bull. 19. *34 p., 36 fig.* Oct., 1918.—The classical symptoms of this disease are "sessile or pedunculated swellings or tumors, sometimes soft and elastic, sometimes firm and tough, that vary in size from that of a millet-seed to that of a child's head." They appear to receive new stimuli at puberty and pregnancies. Associated with it are sometimes found scoliosis, sexual impotency, or feeble-mindedness.—The disease is found only in about 1 in 2000 cases that present themselves to medical clinics or private practitioners for skin diseases. It is highly hereditary, and behaves like a dominant trait. The specificity of location, type and behavior in given families is very striking.—Twenty-nine pedigree charts are printed with the text. There is a bibliography of 119 titles.—*H. H. Laughlin.*

282. ROBERTS, H. F. **Quantitative character-measurements in color crosses.** Science 49: 516–517. May 30, 1919.—Writer suggests that in the study of coat pattern in animals, photographs be taken of the right and left sides and the areas determined by planimeter, ruled squares on the photographic plate, or by placing the animal behind cross-wire screen before taking photograph.—*Sewall Wright.*

283. ROBERTS, HERBERT F. **The founders of the art of breeding. II.** Jour. Heredity **10**: 147–152. *1 fig.* Apr., 1919.

284. ROSENBERG, OTTO. **Chromosomenzahlen und Chromosomendimensionen in der Gattung Crepis. [Chromosome number and chromosome dimensions in the genus Crepis].** Ark. Bot. 15[11]: 1–16. *6 fig.* 1918.—The haploid number of chromosomes in species of *Crepis* is reported as follows: In *virens*, *polymorpha* var. *stricta; Reuteriana*, and *dichotoma*, 3; in *foetida*, *pulchra*, *agrestis*, *parviflora*, *neglecta*, and *nicaensis*, 4; in *multicaulis*, *rigida*, and *rubra*, 5; in *barbata*, 9; and in *biennis*, 20. Previous studies have shown that *tectorum* and *taraxacifolia* have the number 4; *lanceolata* var. *platyphyllos*, 5; and *japonica*, 8.—Special studies of size of chromosomes are reported which show that in species with 3 chromosomes (*virens* and *Reuteriana*) there is 1 large, 1 middle-sized and 1 small chromosome. A species with 4 chromosomes (*C. tectorum*) has 1 large, 1 middle-sized and 2 shorter chromosomes. *C. rubra* has 1 large, 1 middle-sized and 3 short chromosomes. Measurements show that the relative proportions of the different chromosomes are very similar in various species as for example:

	a		b		c		d
C. tectorium....................................	10	:	7.9	:	5.9	:	5.3
C. Reuteriana....................................	10	:	7.4	:	5.7		

Heterotypic divisions show evidences of irregular distribution of chromosomes. The short chromosomes especially tend to go to the wrong pole or to lag and be left behind. In *Reuteriana* about 30 per cent of the divisions show such a tendency, which it is considered may give microspores and macrospores of 3 and 2 chromosomes. In a species with 4 chromosomes, as *C. tectorium*, when a short chromosome goes to the wrong pole spores with 5 (1 large, 1 middle-sized, 3 small) chromosomes and spores with 3 (1 large, 1 middle-sized, 1 short) chromosomes would be formed.

Conclusion is that the 3, 4 and 5 series of chromosome numbers in species of *Crepis* arises through irregular distribution of the smaller chromosomes in reduction divisions and subsequent recombination in fertilization rather than through segmentation or fragmentation of the larger chromosomes.—*A. B. Stout.*

285. SAKAMURA, TETSU. **Kurze Mitteilung über die Chromosomenzahlen und die Verwandtschaftsverhältnisse der Triticum-Arten. [Chromosome number, etc., in Triticum.]** Bot. Mag. Tôkyô **32**: 151–154. 1918.—From studies on root tips and on pollen mother cells author obtained diploid chromosome counts on races of wheat as follows,—*Triticum vulgare* 42, *T. compactum* 42, *T. spelta* 42, *T. turgidum* 28, *T. durum* 28, *T. polonicum* 28, *T. dicoccum* 28, *T. monococcum* 14. This contrasts with haploid counts by Overton, Nakoa, Bally and Dudley of 8 chromosomes for *T. vulgare* and of Kornicke's haploid count of 8 chromosomes for *T. compactum*. Author concludes that the primitive chromosome numbers in *Triticum* species were haploid 7, diploid 14, and that the diploid chromosome number holds the following relation to Schulz's grouping,—Einkornreihe, diploid, 14 chromosomes (*T. monococcum*); Emmerreihe, tetraploid, 28 chromosomes (*T. dicoccum, durum, polonicum, turgidum*); Dinkelreihe, hexaploid, 42 chromosomes (*T. compactum, spelt, vulgare*). The chromosome count of rye, *Secale cereale*, is reported as haploid 7, diploid 14.—*B. M. Davis.*

286. SALMON, C. E. **Papaver Rhaeas, P. dubium and the hybrid between them.** New Phytol. **18**: 111–117. *7 fig.* Mar.–Apr., 1919.—See Bot. Absts. 3, Entry 2187.

287. SALMON, C. E. **A hybrid Stachys.** Jour. Linnean Soc., London **44**: 357–362. *1 fig.* May 16, 1919.—See Bot. Absts. 3, Entry 2188.

288. Salmon, E. S. **On forms of the hop (Humulus Lupulus L.) resistant to mildew (Sphaerotheca Humuli (DC) Burr.). II.** Jour. Genetics **8**: 83–91. Apr., 1919.—See Bot. Absts. 3, Entry 2189.

289. Sand, K. **Experimenteller Hermaphroditismus. [Experimental hermaphroditism.]** Pflüger's Arch. Physiol. **173**: 1–7. 1918.—See Bot. Absts. 3, Entry 1031.

290. Sheppard, W. J. **Hermaphrodite bees.** Jour. Heredity **10**: 160. Apr., 1919.—See Bot. Absts. 3, Entry 1035.

291. Southworth, W. **Twinning in alfalfa.** Jour. Heredity **10**: 182–183. *Fig. 12–13.* Apr., 1919.—See Bot. Absts. 3, Entry 1037.

292. Stout, A. B. **Bud variation.** Proc. Nation. Acad. Sci. [U. S. A.] **5**: 130–134. Apr., 1919.—Further results fully in agreement with facts and conclusions given by author in Carnegie Inst. Washington Publ. No. 218, 1915. Discusses early views on bud variation, and mentions the following tendencies in present day interpretations: (1) transmission by cytoplasm rather than nucleus; (2) factor losses by segregative somatic divisions; (3) spontaneous factor changes in soma. Author has studied bud variations in *Coleus* through 14 generations. Sixteen new color patterns obtained; 15 were constant from first, but 6 of them also appeared as fluctuating variations; one appeared only as a fluctuating variation. Selection for extremes always brought progeny of marked constancy, but with further fluctuations about a new mode. Concludes that recombinations of multiple modifying factors are impossible in bud propagation, and effectiveness of selection indicates actual variation in hereditary units. Reversion to parent patterns cited. Decrease of red and yellow pigment is twice as frequent as increase. Most frequent bud variation was 1 : 2960.—*Merle C. Coulter.*

293. Sturtevant, A. H., C. B. Bridges, and T. H. Morgan. **The spatial relations of genes.** Proc. Nation. Acad. Sci. [U. S. A.] **5**: 168–173. May, 1919.

294. Terry, J. R. **A wingless Wyandotte.** Jour. Heredity **10**: 175. *Fig. 8.* Apr., 1919.—See Bot. Absts. 3, Entry 1038.

295. Thompson, J. W. **Breeding milk goats.** Jour. Heredity **10**: 156–160. *Fig. 3–5.* Apr., 1919.—See Bot. Absts. 3, Entry 1039.

296. van der Wolk, P. C. **Onderzoekingen over blÿvende modificaties en hun betrekking tot mutaties. [Researches on permanent modifications and their relations to mutations.]** Cultura **31**: 82–105. *1 pl.* 1919.—New leaves formed on branches near decayed spots on a tree of *Acer pseudo-platanus,* suddenly become white, followed by the formation of wholly white-leaved branches. These abnormal leaves and branches were remarkable not only for the color of the leaves, but also for their form (with long weak tips), their leaf-stalks longer than normal and reddish with brown spots, their branches finely furrowed and more or less velvety, their strikingly short internodes, inner bark very loose around the wood, a great well-developed pith, flowers greater than usual and reddish, inflorescences with few flowers, flowers at each branch unisexual,—not polygamous, but male or female. The origin of this abnormality resulted from the presence of a certain bacillus, cultivated by the writer in pure-cultures, and called by him the "modification bacillus." A more exact description of this bacillus is not given by the author; he presents only some brief communications about some of its characteristics. This bacillus was able to penetrate the wounds of the tree, not only in branches, but also in seeds; in this last case the young plants, growing from affected seeds were from the beginning white-leaved and thus without vitality. From other observations writer had noticed the disinfecting power of calcium oxalate; therefore he has attempted to remove the infectious organism from the white branches and the affected young plants; the results were very remarkable,—though the "modification bacillus" was killed by the calcium oxalate and after the disinfection the infecting organism could no longer be found in the plant, its efficacy

was not destroyed. Newly formed leaves became white, as during the presence of the organism. Crossings made with not-disinfected flowers gave reciprocally (white male × green female and white female × green male) only white plants (13 and 9); crossings of normal flowers with flowers from an artificially infected inflorescence, green × white, only green (6); white × green, only white (7) plants. Crosses of normal flowers with flowers of disinfected white branches gave hybrids with intermediate leaf-form and spotted leaves (13).—Author discusses possibility of vegetative segregation and of analysis of a chimera, and raises the question whether mutation had been induced. Unfortunately author's plants were lost by a fatality and pure cultures of the affecting organism have not been preserved.—*M. J. Sirks.*

297. VAN SOMEREN, V. G. L. **Melanism in Whydahs.** Avic. Mag. 10: 40–41. Dec., 1918. —States that Jackson's Whydah and another (*Pentheria eques*) tend to become black in captivity. The tendency is less noticeable in females than in males.—*L. J. Cole.*

298. VON UBISCH, G. **Kritische Beträchtungen zur Hypothese der primären und sekundären Koppelung. [Critical consideration of the hypothesis of primary and secondary coupling.]** Zeitschr. indukt. Abstamm. Vererb. 19: 193–201. *3 fig.* June, 1918.—Review of papers by Trow and by Bailey on primary and secondary reduplication according to the theory of Bateson and Punnett, in which the author fails to find that the formulas of Trow agree with the observed facts in certain respects and in others are so general they do not distinguish between the reduplication hypothesis and the chromosome hypothesis of Morgan. When three factors, *A B C*, are coupled Trow's formulas allow for three different possibilities:—(1) There may occur coupling between *A* and *C* and this coupling is always the same. (2) There may sometimes occur coupling between *A* and *C* and sometimes not. (3) The coupling between *A* and *C* may vary in degree. The author points out the necessity for a closer agreement between theory and fact and states the important features of the chromosome hypothesis. In his own experience with barley 19 factor pairs are known, of which 10 up to the present have been found to be coupled, most of these being in two groups.—*D. F. Jones.*

299. WAARDENBURG, P. J. **Aangeboren ooggebreken als oorzaak van blindheid en halfblindheid. [Half-blindness and blindness due to congenital diseases of the eye.]** Genetica 1: 209–284. May, 1919.—A Dutch ophthalmological committee was appointed in December, 1916, to inquire concerning the causes of half-blindness and blindness of persons who were treated by oculists in 1915 and 1916. It was found that 9.2 per cent of the 861 half-blind and 14.1 per cent of the 1444 blind were suffering from congenital diseases. Author, a member of the Committee, has studied these cases (206). He found that 26.7 per cent was due to buphthalmus (increase of pressure in the eye with resultant enlargement); 19.5 per cent to atrophia retinae pigmentosa (degeneration of the nervous cells of the retina); 17.9 per cent to microphthalmus and coloboma (insufficient development of the eye); 17.9 per cent to cataract (cloudiness of the lens); 7.3 per cent to atrophia hervi optici familiaris (a disease that disturbs the optic nerve generally after puberty); 5.3 per cent to albinism; 2.9 per cent to aniridia (insufficient development of the iris with resulting or accompanying disturbances); and 2.5 per cent to achromatopsia (total color-blindness).—Report is divided into 16 chapters, the first 8 of which treat the above-mentioned diseases separately. In order to appreciate fully the results author has added observations made by himself and many foreign investigators. Many interesting ophthalmological questions are mentioned; in congenital eye-diseases it often happens that the centre of the retina, the most delicate part of the eye, which is most highly organized, is affected.—Author considers heredity of paramount importance for all congenital diseases; achromatopsia and albinism appear to be recessive unit characters; the other diseases are probably polyhybrid; however they do not result from crossing of normal, but of abnormal genes. The abnormal variation of germinal factors may be due to mutation, and this possibly means that the germ is disturbed by infection products (for in many cases the author found syphilis among the causes).—In 115 families the parents were 19 times (16.5 per cent) blood-relations. In 75 families direct heredity of the diseases was seen 5 (perhaps 7) times (aniridia, atrophia nervi optici, buphthalmus, cataract, coloboma

and microphthalmus), probably so little because marriage is rarely seen among these diseased people. Author's conclusions harmonize with the casuistic communications of heredity, etc., found in ophthalmic literature, of which the author cites many examples. 152 persons of male sex and 90 of female were affected; the difference was found especially in albinism, atrophia nervi optici, atrophia retinae pigmentosa and buphthalmus. In the final chapter author makes some remarks about prophylaxis. He reviews the dominant, gynephoric and recessive abnormal characters of the eye. He is convinced that positive eugenics can never be rational and absolutely effective, but if marriage is disadvised to sufferers from dominant diseases, and to blood-relations, and if syphilis is thoroughly combatted, the number can be fairly restricted.—*P. J. Waardenburg.*

300. Weatherwax, Paul. **Variation and varieties of Zea Mays.** Proc. Indiana Acad. Sci. 1917: 99–103. 1918.—To show great range of variability in maize author mentions numerous contrasting characters with respect to various plant parts. The fallacy of existing system of classification, resting as it does upon merely incidental variations which happen to be for most part connected with endosperm, is pointed out. Author suggests the best taxonomic treatment would be "to consider *Zea* a monotypic genus and discard all other names than *Zea mays* L."—*L. H. Smith.*

301. Weatherwax, Paul. **Improved technique for corn pollination.** Proc. Indiana Acad. Sci. 1917: 105–107. *2 fig.* 1918.—Description of a device used in artificial pollination of maize for protecting the stigmas. Paraffined paper envelope is formed and attached to shoot in such manner as to permit application of pollen without removing this protecting envelope. Advantages lie in convenience of manipulation and relative freedom from contamination during the pollinating process.—*L. H. Smith.*

302. Weatherwax, Paul. **The evolution of maize.** Bull. Torrey Bot. Club. 45: 309–342. *36 fig.* Aug., 1918.—Rev. in: Bot. Gaz. 67: 104. Jan., 1919. [See also Bot. Absts. 1, Entry 503; 2, Entry 76.]

303. Weatherwax, Paul. **The morphological basis of some experimental work with maize.** Amer. Nat. 53: 269–272. May–June, 1919.—Since in Country Gentleman sweet corn a second flower, usually abortive, becomes functional, the spikelet produces two grains and, as a result of this crowding, straight rows are more or less modified for more economical space arrangements. Genetical studies on the two-flowered condition would probably yield clearer results than genetical studies on irregularities of the rows (East and Hayes). Hermaphrodite flowers of maize are possible because the young flower contains primordia of both stamen and pistil, one or the other of which usually does not develop to maturity. The acquisition of hermaphrodite flowers of maize as the result of injury to the plant (Blaringhem) is not to be interpreted as a progressive mutation since it brings into development rudimentary organs that are vestiges of organs that have been, and are not the forerunners of organs that are to be.—*B. M. Davis.*

304. White, E. A. **Methods of rose-breeding.** Amer. Rose Ann. 1918: 51–55. *7 fig.* 1918.—Account of rose-breeding methods for amateurs. Details regarding best groups, ideal types, methods of growing parent plants, cross-pollination, after-treatment of crossed flowers, and sowing and care of hybrid seed are given.—*Orland E. White.*

305. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Arkansas Agric. Exp. Sta. Bull. 143. *19 p., 9 pl.* Mar., 1918.—Investigation during seasons of 1915, 1916, and 1917 dealt with effect of pollen upon size, shape and quality of apple. Hand pollinations were made in fertile combinations of Ben Davis, Grimes, Jonathan, and Winesap. Self-pollinated specimens were used each year as basis for comparing effect of pollen in the crosses.—From 11,290 hand pollinations 773 apples were obtained. The form and ground color of the apples of all crosses were consistently typical of the variety. Results showed necessity for cross pollination in the four varieties under test. Cross pollination

was most effective in following crosses: Ben Davis × Grimes, Grimes × Jonathan or Ben Davis, and Ben Davis × Jonathan. No influence of pollen was found upon size, color, shape or quality.—*M. J. Dorsey.*

306. Winge, Ö. **On the relation between number of chromosomes and number of types, in Lathyrus especially.** Jour. Genetics 8: 133–138. *Pl. 5.* Apr., 1919.—Discusses in some detail interpretation of genetic data in relation to cytological phenomena, particularly as regards chromosomes and hypothesis that number of independently segregating factor pairs in a given organism corresponds to haploid or x number of chromosomes. Preparatory to study of sweet pea (*Lathyrus odoratus*) from this standpoint, this species, together with *Lathyrus latifolius* was cytologically investigated. Haploid chromosome number for each species is 7, diploid 14. All seven chromosomes are very similar in shape and size. Character of cytological phenomena in both species is identical, preparations of one being indistinguishable from those of the other. Finds no cytological support in observations on *Lathyrus* for chiasmatype hypothesis (in sense of Janssens).—*Orland E. White.*

307. Winge, Ö. **On the non-Mendelian inheritance in variegated plants.** Compt. Rend. Trav. Lab. Carlsberg 14^3: 1–20. *4 fig.* 1919.—Experiments with normal green and *albomaculata* variety of *Humulus Japonicus* showed that normal × *albomaculata* gave 746 normals and 0 *albomaculata* that albomaculata × normal male produced 0 normal and 35 *albomaculata;* and that *albomaculata* × *albomaculata* gave 0 normals and 268 *albomaculata.* Mother plant proved determinative for leaf color. Results are not due to apogamy since pollination was necessary for fruiting; no data as to whether other qualities are transmitted by male. No entirely white ("*albina*") nor self-colored green forms occurred and author considers hereditary factors situated in cytoplasm (not including plastids); since transmission is maternal it is supposed that no cytoplasm accompanies male gamete in fertilization. Surveying work of other investigators author would explain Ikeno's results with *albomaculata* variety of *Capsicum annuum* as due to similar cytoplasmic determiners, but would postulate that male nucleus is accompanied by some cytoplasm. Since pure white or self-colored green forms arise in Baur's *Antirrhinum* and Corren's *Mirabilis,* author considers these variegated cases dependent on plastids (transmitted by egg) which may entirely separate out of some cells in course of ontogeny or oögenesis. Baur's *Pelargonium* case is explained by plastids transmitted by egg and male gamete. Author suggests that true heredity should be defined to include qualities having material foundation in any part of cell belonging to organism itself—nucleus, plastids, or cytoplasm. Mendelism does not include all true heredity.—*J. P. Kelly.*

308. Woods, Frederick Adams. **Kaiserism and heredity.** Jour. Heredity 9: 348–353. *1 chart.* Dec., 1918.—An analysis of the family tree of the Caesars, in which the tyranny and perfidy of Nero, Caligula and Agrippina "the Younger" are traced in true pedigree fashion, as such traits descend, segregate and recombine in the earlier Caesars.—*H. H. Laughlin.*

HORTICULTURE

J. H. Gourley, *Editor*

309. Anonymous. **Why do Japan walnuts bear butternuts?** [Rev. of: Willard G. Bixby. Same title. Presented at Albany, Georgia, meeting of the National Nut Growers Association.] Amer. Nut Jour. 10: 5–6. *Pl. 1–5.* 1919.—It has often been observed that when Japan walnuts (*Juglans sieboldiana* and *Juglans cordiformis*) are grown in the United States, the seedlings from these trees produce nuts as rough shelled as those of the butternut (*Juglans cinerea*) or even more so. The various hypotheses advanced to account for this are discussed and the conclusion is reached that it is due to hybridization with the native butternut.—*R. H. Taylor.*

310. Bailey, Herbert S. **The production and conservation of fats and oils in the United States.** U. S. Dept. of Agric. Bull. 769. *48 p.* 1919.—See Bot. Absts. 3, Entry 196.

311. Bates, Sam C. **Success with English walnuts in the South.** Amer. Nut Jour. **10**: 27. 1919.—A brief statement of the behavior of an English walnut tree in central Alabama.—*R. H. Taylor.*

312. Beattie, W. R. **The city home garden.** U. S. Dept. Agric. Farmers' Bull. 1044. *40 p., 16 fig.* 1919.

313. Boulger, G. S. [Rev. of A. D. Webster. **Coniferous trees for profit and ornament; being a concise description of each species and variety, etc., etc.** *XX + 298 p. 28 pl.* Constable & Co. (Date not given.) (The title is very long, many of the chapter headings being included.)] Jour. Bot. **57**: 102–103. 1919.

314. Darrow, George M. **Strawberry culture: Eastern United States.** U. S. Dept. Agric. Farmers' Bull. 1028. *50 p., 18 fig.* 1919.

315. Darrow, George M. **Strawberry varieties in the United States.** U. S. Dept. Agric. Farmers' Bull. 1043. *36 p., fig. 8.* 1919.

316. Dearing, Charles. **Muscadine grape paste.** U. S. Dept. Agric. Farmers' Bull. 1033. *15 p.* 1919.

317. Drummond, Bruce. **Propagation and culture of the date palm.** U. S. Dept. Agric. Farmers' Bull 1016. *23 p., 10 fig.* 1919.

318. Edwards, Chas. L. **Demand has exceeded development of seedling nuts in Texas.—now what?** Amer. Nut Jour. **10**: 23–26. 1919.—Discusses the gradual destruction of the forests of seedlings pecans, and the importance of developing groves of improved varieties.—*R. H. Taylor.*

319. Edwards, Chas. L. **Bees and grafting wax.** Amer. Nut Jour. **10**: 21. 1919.—Wild and Italian bees both industriously removed grafting wax from pecan grafts even when softened with alcohol. A few drops of crude carbolic acid stirred into the wax completely prevented further loss.—*R. H. Taylor.*

320. Edwards, Chas. L. **Walnuts in north Texas.** Amer. Nut Jour. **10**: 21. 1919.—Random notes. Dormant chip budding in early spring of Mayette and Franquette walnut scions was successful on black walnut stocks. Frosts killed entire growth from the buds at end of third year and again at end of fourth year. Rush and Pomeroy varieties tested later were not killed by frosts but suffered badly from sunburn. He concludes that English walnuts will probably not prove suitable to North Texas conditions though many of the black walnut varieties are doing well.—*R. H. Taylor.*

321. Edwards, Chas. L. **Grooming for another season.** Amer. Nut Jour. **10**: 11. 1919.—Describes briefly the late winter and spring work to be done in connection with pecan propagation.—*R. H. Taylor.*

322. Edwards, Chas. L. **Thoroughbred pecan trees.** Amer. Nut Jour. **10**: 10. *2 fig.* 1919.

323. Federal Horticultural Board. U. S. Dept. Agric. **Amendment No. 2 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements **61**: 33. 1919.—See Bot. Absts. 3, Entry 400.

324. Federal Horticultural Board. U. S. Dept. Agric. **Nursery stock, plant and seed quarantine. Notice of quarantine No. 37 with regulations.** Service and regulatory announcements **57**: 101–110. 1919.

325. Federal Horticultural Board. U. S. Dept. Agric. Amendment No. 1 to regulations supplemental to notice of quarantine No. 37. Service and regulatory announcements 60: 21–22. 1919. See Bot. Absts. 2, Entry 1291; 3, Entry 399.

326. Gladwin, F. E. A test of commercial fertilizers for grapes. New York Agric. Exp. Sta. [Geneva] Bull. 458: 27–43. 1919.—These tests show that nitrogen, phosphorus and potassium have had a marked beneficial effect upon wood growth, yield and quality of fruit. The data indicate that of the three elements nitrogen has been most helpful. Potassium has given more pronounced results than phosphorus up to the present, although the latter has had a more beneficial effect upon the green-manure crops in the vineyard. Nitrogen has not only affected favorably the growth of wood, but it has increased the fruit and given larger berries and clusters. Phosphorus and potassium have increased the production of wood and fruit, but have not influenced the quality of the fruit to the same extent as the nitrogen. Potassium has caused earlier ripening of the foliage than the other elements. Even though the same number of canes be tied up for fruiting purposes, the data show that the fertilizer plats have produced a decided gain of fruit over the unfertilized. The foliage, after the first few years, has been of better color and size in the plats to which nitrogen was applied while the phosphorus and potassium plats ranked second and the check plat a poor third.—*F. E. Gladwin.*

327. Gould, H. P., and George M. Darrow. Growing fruit for home use. U. S. Dept. Agric. Farmers' Bull. 1001. *40 p., 26 fig.* 1919.

328. Gould, H. P. Fig growing in the South Atlantic and Gulf States. U. S. Dept. Agric. Farmers' Bull. 1031. *47 p., 24 fig.* 1919.

329. Hadley, O. M. Improved methods in pecan propagation. Amer. Nut. Jour. 10: 4. 1919.—A general discussion is given of root pruning of nursery trees to secure better root systems for transplanting, and its relation to pecans. This is followed by a discussion of the possible desirability of double-working pecan varieties to overcome differences in growth. The claim is made that the effect of scion on stock is very pronounced. Observation of over 100 trees each of Delmas and Moore in north Florida shows that the former makes a vigorous stocky growth and an unusually fine root system, while the latter makes a decidedly less vigorous and very much inferior root system. The belief is expressed that the difficulty with the Moore could be largely overcome by double-working on the Delmas to give increased vitality. This is based on experiments with double-working the Schley, Pabst and Money on Delmas, the results being entirely satisfactory in every case. It is believed that this practice will prove to be commercially profitable.—*R. H. Taylor.*

330. Headlee, Thomas J. Control of the principal insects injurious to the apple above ground. Massachusetts State Dept. Agric. Circ. 9. *11 p.* 1919. [Reprinted without change in: Massachusetts Fruit Growers' Assoc. Ann. Rept. 1919] This is a popular summary of the most recent methods of spray control of apple insects in the northeastern United States.—*J. K. Shaw.*

331. Hedrick, U. P. Factors affecting hardiness in fruits. Massachusetts State Dept. Agric. Circ. 6. *10 p.* 1919. [Reprinted without change in: Massachusetts Fruit Growers' Assoc. Ann. Rept. 1919].—This is a popular discussion of winter injury to fruit trees and means of avoiding it.—*J. K. Shaw.*

332. Jordan, W. H. Director's report for 1918. New York Agric. Exp. Sta. [Geneva] Bull. 457. *25 p.* 1918.—See Bot. Absts. 3, Entry 856.

333. Otis, A. W. Fruit market possibilities in the export trade. Massachusetts State Dept. Agric. Circ. 7. *7 p.* 1919. [Reprinted without change in: Massachusetts Fruit Growers' Assoc. Ann. Rept. 1919].

334. Popenoe, Wilson. **The Tavocado in Guatemala.** U. S. Dept. Agric. Bull. 743 *69 p., 23 pl.* 1919.—This bulletin gives the result of studies in the avocado plantings of Guatemala. The author states that probably in no other country are so many fine avocados grown. Information is given on the extent of the industry, the uses made of the crop and the climatic zones in which avocados are found to thrive. The author says that it is possible that the types, which should better be termed races, may have been derived from distinct species, but the wild prototype has not been found. The three races described are the Guatemalan, the West Indian and the Mexican. Information is given concerning the origin of choice varieties and a considerable number of varieties are described. Practical information is also given as to cultural methods and marketing.—*W. H. Chandler.*

335. Riehl, E. A. **Profitable chestnut growing.** Amer. Nut Jour. 10: 27. 1919.—A brief statement of best varieties now available. Figures on production in pounds for the first 16 years of the life of a Boone chestnut are given.—*R. H. Taylor.*

336. Van Trump, S. H. **English walnut in Marion County, Oregon.** Amer. Nut Jour. 10: 13. 1919.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

337. Brown, Forest B. H. **The preparation and treatment of woods for microscopic study.** Bull. Torrey Bot. Club 46: 127–150. *Fig. 1–6.* 1919.—An investigation of the woods of Hawaii led to the development of special technique for sectioning many of the hard tropical woods. Information is presented as to use of microtome and knife. For sectioning, blocks should be cut true. Air can be removed by alternate boiling and cooling, and for softening hard woods it is safe to use strong hydrofluoric acid, which can be removed by washing for 4 days in running water; then blocks can be soaked in glycerine. Instructions are given for imbedding in celloidin where this process is necessary. In using Schultze's method for maceration, equal volumes of acid and water should be used for safety. For differential staining, Haidenhain's iron-haematoxylon is recommended with a counter stain of saffranin; for soft cellulose tissues of bark Congo red is better than saffranin. Microchemical reactions are given for cellulose, cellulose-lignin, gums, mucilaginous layers, essential oils, resins, gum resins, fats, tannin, mineral crystals; and for chemical growth-rings when structural growth-rings are lacking. Liquid penetration tests are of use for ascertaining the presence of tyloses and gums.—*P. A. Munz.*

338. Colani, M. **Recherches sur les premières phases du développement de quelques Combretacées et Barringtoniées. [Early stages of development of some Combretaceae and Barringtoniaceae.]** Thesis, Fac. Sci. Univ. Paris, 1914. [Through bibliographical note by A. P. Allorge, in: Rev. Gén. Bot. [Paris] 30: 301. 1918.]—The Combretaceae studied (*Terminalia Catappa* Willd., *T. chebula* Willd. and *Poivrea* sp.) are characterized by a slight growth in length of the hypocotyl and a considerable elongation of the radicle. Germination in the case of *Barringtonia speciosa* Willd. is similar to that characteristic of certain Myrtaceae in the fact that there are no cotyledons, their function being assumed by the hypocotyl. The cells of the hypocotyl are hypertrophied, and there is a considerable development of woody tissue in the radicle. The cellular differentiation, first of the radicle, then of the plumule (in *Barringtonia*), occurs during germination in the tissues of the hypocotyl.—*C. E. Allen.*

339. Guérin, Paul. **Developpement de l'anthère et du pollen des Labiées. [Development of the anther and pollen in the Labiatae.]** Compt. Rend. Acad. Sci. Paris 168: 182–185. 1919.—The work of Warming on *Mentha aquatica* L. and of the author on the sages is believed to be the only published work on the development of the anther and pollen in the Labiatae.

In order to secure a more complete knowledge of anther and pollen formation in this family, 60 species belonging to 40 genera were studied. Brief note is made of the method of development of the pollen sacs, the pollen mother cells, the "nourishing tissues" and the anther walls. The reduction division forming the pollen grains is not different from that found in other plant groups.—*V. H. Young.*

340. Rosendahl, C. O. Variations in the flowers of Erythronium propullans Gray. Torreya 19: 43–47. *Fig. 1–3.* 1919.—The stamens in this very local species show marked heteromorphism, those of the outer whorl averaging 6.32 mm. in length, of the inner 7.99 mm. Considerable variation in the size of the anthers is also noticed, but unrelated to the filament-length. The number of perianth-segments varies from 6 to 4, of stamens from 6 to 2. In the trimerous flowers the ovary is 3-celled, in the tetramerous 2-celled. The flowers are smaller than in any other species of the genus, probably due to a diversion of food-supply into the offshoot.—*J. C. Nelson.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

Edgar W. Olive, *Editor*

341. Anonymous [B. O. Dodge]. Index to American mycological literature. Mycologia 11: 97–100. 1919.

342. Anonymous [B. O. Dodge]. Index to American mycological literature. Mycologia 11: 158–161. 1919.

343. Arnaud, G. Fumagines du Midi de la France. [The sooty molds of southern France.] Bull. Soc. Path. Vég. France 4: 95. 1918.—*Capnodium meridionale* with perithecia is reported on branches of *Oleo europea* and *Ceratocarpia cactorum* with perithecia on branches of *Ficus carica* and *Citrus aurantium.* The fungi were associated with scale insects on all the hosts.—*C. L. Shear.*

344. Arthur, Joseph Charles. New species of Uredineae—XI. Bull. Torrey Bot. Club 46: 107–125. 1919.—*Puccinia wyomensis* Arthur and *P. missouriensis* Arthur are reduced to synonomy. The following new names are proposed: *Puccinia egressa* for *P. egregia* Arth. 1911, *Puccinia (?) fuirenicola* for *Uredo Fuirenae* P. Henn. 1899, *Puccinia (?) Scribnerianum* for *Uromyces Aristidae* Ellis and Ev. 1887, *Puccinia pallescens* for *Uredo pallida* Diet. and Holw. 1897, *Puccinia imposita* for *Uredo Muhlenbergiae* Diet. 1897, *Uromyces Shearianus* for *U. Atriplicis* Arth. 1918. *Uredo Kaernbachii* P. Henn. 1894 is changed to *Puccinia Kaernbachii* (P. Henn.). The following new species are described: *Puccinia Cockerelliana* Bethel, *P. inclita, P. Coelopleuri, P. parca, P. gentilis, P. prospera, P. massalis, P. invelata* Jackson; *Uredo biporula, U. amicosa, U. ignava*; *Aecidium Clemensae, A. Bourreriae* Holway, *A. Chamaecristae, A. modestum,* and *A. ingenuum.*—*P. A. Munz.*

345. Batchelor, Marjorie Dietz. Aerobic spore-bearing bacteria in the intestinal tract of children. Jour. Bact. 4: 23–24. *Pl. 1–8.* 1919.—The author reports the different species and the frequency of each species of aerobic spore-bearing bacteria found in the dejecta of over fifty children. Five new species are described, including *Bacillus badius, Bacillus fusus, Bacillus tritus, Bacillus lautus, Bacillus flexus.*—*Chester A. Darling.*

346. Beach, Walter Spurgeon. Biologic specialization in the genus Septoria. Amer. Jour. Bot. 6: 1–33. *Pl. 1, 13 diagrams, 4 tables, 1 graph.* 1919.

347. Bensaude, Mathilde. Recherches sur le cycle évolutif et la sexualité chez les basidiomycètes [Researches on the life cycle and sexuality in Basidiomycetes]. *156 p., 13 pl., 30 fig.* Nemours, 1918.—*Coprinus fimetarius* Fr., *Armillaria mucida* Schrad., and *Tricholoma*

nudum Bull., are the mushrooms studied. The author considers Bouin's picro-formol the most satisfactory fixing agent and iron haematoxylin counter stained with eosin, fuchsin, and light green as the best stains. The work is divided into two phases; the first deals with the morphology and cytology of the mycelia and the second treats of results obtained from the study of single spore cultures of *Coprinus fimetarius*.—The mycelia of the three species of fungi Miss Bensaude studied were obtained from germinating spores as well as from material collected in the field. The author accepts R. Falck's classification of the mycelia into primary, secondary, and tertiary forms. The claim is made that the first few days after the germination of the spores in Coprinus the resulting mycelia belong to the primary class in which the hyphae are partitioned off into cells which contain from one to many nuclei. These uninucleated cells may give rise to varying numbers of uninucleated oidia.—Disarticulated hyphal cells which she calls "*pseudoidia*" are also formed which may germinate like true oidia. The nuclei in the germ tubes apparently divide amitotically.—Cross walls with clamp connections never appear in the hyphae of the primary mycelia. Miss Bensaude grew single spores of *Coprinus fimetarius* in pure cultures. She succeeded in isolating single spores. In two cultures of these, abundant mycelium was produced, which remained primary and did not produce carpophores. When parts of each mycelium were mixed in a culture, a secondary mycelium appeared and fruit bodies were produced. The chief method of bringing about the plasmogamy seems to be through the union of a hyphal cell of one thallus with an oidium from another thallus, although it may be brought about by the anastomosis of two hyphal cells of different thalli in *C. fimetarius*. Miss Bensaude thus concludes that the "*dicaryon*" in *C. fimetarius* is formed following plasmogamy between cells coming from two different thalli.—The transformation of a primary mycelium into a secondary mycelium is very difficult to observe. The fusion of two cells (plasmogamy or pseudogamy) introduces the cytoplasm and nucleus or nuclei of one cell into the other. This results in the establishment of a binucleated cell. If two cells unite which have more than two nuclei in common, all disintegrate but two. The uninucleated oidium may fuse with a hyphal cell and this is a very common means of bringing about the initial binucleated condition of the cell.—Each cell in these secondary hyphae is binucleated, constituting a "*dicaryon*." Conjugate nuclear division occurs in these hyphae as a rule in the apical cell, although intercalary cells divide occasionally. At the time of division the two nuclei move to the middle of the cell and the actual process of cell division is preceded by the formation of a protuberance which is to form a clamp. One of the nuclei which Miss Bensaude calls +, on the basis of her results with single spore cultures, enters this very short branch and the − nucleus remains at about the same level in the mother cell. Spindles are formed and conjugate nuclear division takes place. One of the + daughter nuclei goes back into the mother cell and the other goes to the apex of the young clamp. A cross wall cuts off the beak cell from the mother cell. Of the two − daughter nuclei, one goes to the apical part of the mother cell and the other to the basal part, and a cross wall is formed at the level of the young clamp dividing the cell into an apical portion with + and − daughter nuclei and a basal cell with only the − daughter nucleus. The little beak now fuses with the basal cell and its nucleus passes into this cell so that it also becomes binucleated. Very often the apex of the beak fuses with the mother cell before nuclear division takes place.—Reversion of secondary to primary mycelium occurs, in which case a uninucleated cell appears among binucleated cells. No clamps are found on the cross walls of this cell. These uninucleated cells may bear oidia. [See Bot. Absts. 3, Entry 597.]—*Michael Levine.*

348. Burt, E. A. The Thelephoraceae of North America. IX. Aleurodiscus, Ann. Missouri Bot. Gard. 5: 177–203. 1918.—Fourteen species are included. It is pointed out that the limits of the genus are indefinite. The species are characterized especially by unusually large basidia and by noteworthy paraphyses. [See Bot. Absts. 1, Entry 774.]—*H. M. Fitzpatrick.*

349. Burt, E. A. The Thelephoraceae of North America. X. Hymenochaete. Ann. Missouri Bot. Gard. 5: 301-372. 1918.—Thirty-six species are recognized for North America. The genus is characterized primarily by the possession of "slender, somewhat conical colored

setae between the basidia." The form of the fruit body varies from stipitate to resupinate. Emphasis is placed upon the fact that a single species may vary greatly in habit and form depending upon its position on the substratum. A species may be resupinate on the under side of a log and reflexed when developed up its side. Attention is called to the fact that the species of this genus possess a chemical substance in the tissue of the fruit body which causes an immediate darkening of sections when potassium hydrate is brought in contact with them. The genus is subdivided into two groups of species. In one group the setigerous tissue is seated directly on the substratum. In the other a hyphal layer destitute of setae lies between the substratum and the setigerous layer.—*H. M. Fitzpatrick.*

350. Chenantais, J. E. **Trois Descomycètes. [Three Discomycetes.]** Bull. Trimest. Soc. Mycolog. France 34: 34–40. *Pl. 3.* 1918.—The author describes three Discomycetes, *Ascophanus Holmskjoldii, Hyalinia Ulicis,* and *Pithyella harnata.—Fred C. Werkenthin.*

351. Chenantais, J. E. **Étude sur les Pyrénomycètes. [A study of the Pyrenomycetes.]** Bull. Trimest. Soc. Mycolog. France 34: 47–73. *Fig. 1–5.* 1918.—The author comes to the conclusion that the exterior distinction upon which the genera *Caelosphaeria* and *Nitschkia* are based are of no value. *Nitschkia tristis* and *Nitschkia collapsa* constitute only two forms of the same genus.—*Fred C. Werkenthin.*

352. Conn, H. J., and J. W. Bright. **Ammonification of manure in soil.** Jour. Agric. Res. 16: 313–350. 1919.—See Bot. Absts. 3, Entry 850.

353. Davis, W. H. **The aecial stage of alsike clover rust.** Proc. Iowa Acad. Sci. 24: 461–477. 1917 (1918).—A rust of the genus *Uromyces* is prevalent in this latitude on the common clovers, such as *Trifolium repens, T. pratense,* and *T. hybridum* (alsike). Evidence is given to show that pycnia and aecia are developed on the leaves of alsike clover. Comparison of the aecia and pycnia of the rust on *T. hybridium,* with that on *T. repens* and *T. pratense,* shows that they are not the same.—Cross inoculations with any of the spore forms of alsike clover rust show that this rust will not cause infection on red clover, white clover, mammoth clover, crimson clover, alfalfa, or white melilot. The rust of alsike clover is shown to be long cycled, autoecious, having all the spore forms. A morphological difference is evidenced by measurements. The causal organism is *Nigredo hybridi* Davis; Otherwise, *Uromyces hybridi* Davis.—*I. E. Melhus.*

354. Dufour, León. **Note sur le mode de végétation du Plicaria leiocarpa Currey. [Method of forming fruiting bodies by Plicaria leiocarpa Currey.]** Bull. Trimest. Soc. Mycolog. France 34: 31–33. 1918.—The author gives a detailed description of the formation of fruiting bodies of *Plicaria leiocarpa.—Fred. C. Werkenthin.*

355. Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological relations of the development of parasitic fungi.]** Bull. Trimest. Soc. Mycolog. France 34: 8–26. 1918.

356. Eriksson, Jacob. **Zur Entwickelungsgeschichte des Spinatschimmels (Peronspora spinaciae (Grew.) Laub.) [Life history of P. spinaciae.]** Ark. för Bot. 15^{15}: 1–25. *Pl. 4, 3 fig.* 1918.—The fungus is widely distributed geographically. It has been confused with *P. effusa* on Chenopodiaceae but it is morphologically as well as physiologically different.—Large spots appear on the young leaves of spinach (*Spinacia oleracea*) which are yellowish to white above and gray-blue beneath from conidiophores. Later the whole leaf is involved.—Most investigators have denied the presence of oospores in *P. spinaciae.* Accordingly a cytological study of the development cycle of the organism was undertaken. Leaf tissue from a healthy plant was compared with apparently disease-free leaf tissue of a plant showing the disease in its primary stage on certain leaves. No trace of mycelium could be found in either, but certain rather pronounced differences were observed in cell structure. These are illustrated by photomicrographs. Bodies resembling chondriosomes and mitochondria were

observed which are thought to be pathological manifestations, i.e., *mycoplasm*.—After the two growth phases in the host have passed there comes a time when the fungus gains supremacy. Anatomically this is manifest in the dissolution of the chlorophyll granules. Nucleoli of the various sizes appear and mark the end of the mycoplasm stage. Soon the typical hyphal bodies become evident first within the cell and later in the intercellular spaces.—Antheridia and oogonia are formed on the intercellular mycelium and fusion stages are shown. Oospores develop. They can be found in dead tissue mostly singly in the spongy parenchyma or near the lower epidermis.—The oospores germinate immediately. The germ tube issues from a stomata and, remaining simply or becoming branched, produces spores which function as zoosporangia.—The return of the fungus to the mycoplasm stage remains to be investigated.—*D. Reddick.*

357. Grove, Otto. A ropy cider bacillus. Ann. Rept. Agric. and Hortic. Res. Sta. Univ. Bristol. **1917**: 15–17. 1918.—See Bot. Absts. 3, Entry 455.

358. Jenkins, Anna E. **Brown canker of roses, caused by Diaporthe umbrina.** Jour. Agric. Res. **15**: 593–600. *Pl. D and 46–47.* 1918.—The causal organism is described as new under the name *Diaporthe umbrina.* [See Bot. Absts. 2, Entry 768.]—*H. M. Fitzpatrick.*

359. Jokl, Milla. **[Pythium conidiophorum nov. sp., ein Parasit von Spirogyra.]** Österr. Bot. Zeitschr. **67**: 33–37. *1 pl.* 1918. [From abstr. by Matouschek in Zeitschr. Pflanzenkr. **28**: 344. 1918.]

360. Jordan, W. H. **Director's report for 1918.** New York Agric. Exp. Sta. [Geneva Bull. **457**: 1–25. 1918.—See Bot. Absts. 3, Entry 856.

361. Juillard, M. G. **Deux Bolets rares. [Two uncommon Boleti.]** Bull. Trimest. Soel Mycolog. France **34**: 2–7. *Pl. 1–2, colored.* 1918.—The author describes two rare Boleti, *Boletus calopus* Fr. and *Boletus olivaceces* Schaeff.—*Fred C. Werkenthin.*

362. Koch, G. P., and J. R. Butler. **Cross inoculation of legumes.** Soil Sci. **6**: 397–403 1918.—*Bacillus radicicola* isolated from the roots of alfalfa, sweet clover and burr clover al cross-inoculate. Organisms isolated from any one of the 4 clovers, crimson, alsike, red and white produced a vigorous nodule formation by cross inoculation. The organisms of garden peas, vetch, Canada field peas, and sweet peas also cross-inoculate.—*J. J. Skinner.*

363. Lloyd, C. G. **Mycological notes, no. 54.** *P. 766–780, fig. 1149–1174.* Cincinnati, 1918.—The cover of this number bears the photograph of Professor Thomas H. Macbride, accompanied by a brief expression of personal appreciation. Photographs and notes on the following fungi are given: *Cordyceps sinensis, Xylaria tuberculosa, X. polymorpha, X. fusca, X. stromatica, X. gracillima, Camillea (?) sulcata, Scleroderma sinnamariense, Trametes argyropotamica, Baeomyces roseus, Polyporus myclodes, Trametes pusillus, Exidia uvapassa, Cladoderris thwaitesii, Fomes marginatus, Irpex subcoriacea, Pleurotus sapidus, Camillea bomba, Isaria sphecocephala (?),* and *Sebacina spongiosa.* Comments by correspondents on "Mycological Myths" are appended. A short account is given by N. Gist Gee of the history of *Cordyceps sinensis* in Chinese medicine and pharmacy. This plant is the celebrated "Chinese plant worm" of Chinese materia medica.—*H. M. Fitzpatrick.*

364. Lloyd, C. G. **Mycological notes, no. 55.** *P. 782–796, fig. 1175–1199.* Cincinnati, 1918.—The photograph of Mr. John Dearness appears on the cover of this number, and is accompanied by a brief biographical sketch. The genus Auricularia is discussed, and a list of the species regarded as worthy of recognition is given. Only eight of the seventy-two named species are recognized. Photographs and notes are given for *A. auricula Judae, A. Moellerii,* and *A. delicata.* Three species of Stereum having dark, seal-brown, pubescent pilei are figured and discussed. These are *S. illudens, S. deceptivus,* and *S. Phoca.* "Rare and interesting fungi received from correspondents" include the following species: *Polyporus Wilsonianus, Secotium pedunculatum, S. tenuipes, S. russuloides, S. australe, Mucronella tenuipes*,

Tremella fuciformis, Polystictus cladophorus, P. anomalous, Irpex versatilis, I. vellereus, Polystictus imbricatus, Lysurus Gardneri, Polyporus tsunodae, Pterula mannii, Tremella frondosa, Geaster clelandii, Irpex cingulatum, Lycoperdon pisiforme, and *Lentinus fasciatus.* Notes and photographs are given for all of these. Attention is called to the pseudosclerotia produced by the last named species.—*H. M. Fitzpatrick.*

365. Lloyd, C. G. **Xylaria Notes, no. 1.** *P. 1–16, fig. 1200–1236.* Cincinnati, 1918.—The author is now interesting himself in those Ascomycetes which have a large fruiting structure. He desires that collectors send these to him, and he asks here especially for material of Xylaria. In this paper he discusses the problems which confront the student undertaking monographic work in this group, and states that much of the systematic work on Xylaria has been inaccurately done. In certain species of Xylaria the interior of the stroma disappears leaving the center of the club hollow. These species are here discussed as "the hollow Xylarias." Approximately fifteen species are figured and described. Notes and photographs are also given for other interesting species of Xylaria received from correspondents. These include *X. Ridleyi, X. discoidea, X. mellisii, X. ectogramma,* and *X. gomphus. Isaria flabelliformis* is figured and its possible connection with *Xylaria corniformis* is discussed.—*H. M. Fitzpatrick.*

366. Lloyd, C. G. **Xylaria Notes, no. 2.** *P. 17–32, fig. 1324–1357.* Cincinnati, 1918.—Notes and figures of the following species are given: *Xylaria castorea, X. chordaeformis, X. pistillaris, X. filiformis, X. apiculata, X. arbuscula, X. herculea, X. scruposa, X. anisopleura, X. torquescens, X. cookei, X. multiplex, X. obesa, X. lancea, X. luxurians, X. bipindensis, X. pallide-ostiolata, X. moriformis, X. faveolis,* and *X. cristulata.* The possible connection of *Isaria flabelliformis* with *X. corniformis* is discussed.—*H. M. Fitzpatrick.*

367. Lloyd, C. G. **Mycological Notes, no. 56.** *P. 798–812, fig. 1239–1266.* Cincinnati, 1918.—The title page of this number bears the photograph of Doctor George A. Rex. An accompanying note makes reference to the value of his work in American Myxomycetes, and contains a brief account of his life. The fungi discussed in the number were in most cases received from Brazil. Of these may be mentioned *Rickella transiens, Geaster stipitatus, Hydnum villipes, Polyporus inopinus, Rimbachia cyphelloides, R. vitellina. Dacryomitra depallens, Geaster trichifer,* and *Polyporus humilis.* The genus Endogone is briefly discussed and *E. tuberculosa* is described and figured. *Sarcosphaeria coronaria* is figured and discussed. A collection made by S. H. Burnham in New York is regarded as the first American collection of this species. *Cordyceps ophioglossoides* is said to occur on a locust in Japan. Notes and photographs are also given for the following: *Lenzites beckleri, Isaria cosmopsaltriae, Stereum plicatum, Polyporus salebrosus, Auricularia Hunterii, A. delicata, Merulius castaneus, Podocrea cornu-damae, Polyporus profissilis, P. antilopus, Lenzites glabra, L. ungulaformis,* and *Polyporus conjunctus.*—*H. M. Fitzpatrick.*

368. Moreau, Fernand. **La biomorphogénèse chez les lichens. [Biomorphogenesis of lichens.]** Bull. Trimest. Soc. Mycolog. France 34: 84–85, 1918.—The author shows that biomorphogeny is found in Lichens. In his first chapter, entitled Bimorphogeny brought about by a foreign alga within the gonidial layer of Lichen, he states that within the outer or inner surface of the Peltigeraceae a green alga oftentimes produces knots, which are known as cephalodia. These cephalodia consist of a mixture of algal cells and fungal filaments, similar to the gonidial layer. Biomorphogenesis is evident in this case. In his second chapter the author shows how biomorphogeny is brought about by the alga within the gonidial layer.—*Fred C. Werkenthin.*

369. Molliard, Marin. **Production d'acide citrique par le Sterigmatocystis nigra. [Production of citric acid by Sterigmatocystis nigra.]** Compt. Rend. Acad. Sci. Paris. 168: 360–363. 1919.—See Bot. Absts. 3, Entry 445.

370. Patouillard, N. **Quelques champignons de Madagascar. [Several fungi from Madagascar.]** Bull. Trimest. Soc. Mycolog. France 34: 86–91. *Fig. 1.* 1918.—On a botanical collecting trip in Madagascar a number of fungi were collected by Viguier in 1912, some of which are interesting enough to be mentioned here. *Trematophyletis Leptodesmiae* n. gen. and n. sp., *Gymnoconia Althemillae* n. sp., *Limacinula cupularis* n. sp., *Meliola amphitricha* Fr. var. nov. *pungens*, *Sphaerella Hydrocotyles-asiaticae* n. sp., *Otthia deformans* n. sp. causing tumors on limbs on small branches of Philippia, *Ophiobolus Coffeae* n. sp., and *Septoria mellispora* n. sp.—*Fred C. Werkenthin.*

371. Peyronel, B. **Secondo elenco di funghi di Val S. Martino o Valle della Germanasca. [Second contribution on fungi of San Martino.]** Nuovo Gior. Bot. Ital. 25: 146–192. 1918.—The author deals primarily with the Basidiomycetes (Agaricaceae and Polyporaceae especially) listing only such species which could be identified with certainty. In case where previous descriptions proved inadequate or misleading, a short description is given, special emphasis being laid on points of taxonomic importance. The author also notes elevation above sea level, exact location, and habitat for each species. Of the 128 species treated, 72 are new for that region and one, *Boletus laricinus,* is new for Italy.—*Ernst Artschwager.*

372. Pierre, H. **Superposition de deux Russules,—Russula olivacea Schoeff. [Superpositions of two Russulae.]** Bull. Trimest. Soc. Mycolog. France 34: 74–75. *Fig. 1.* 1918.—The author distinguishes between two Russulae, one characterized by being markedly concave, and by having a diameter of 16 cm., while the other is much smaller, only 3.5 cm., and distinguished by intimately adhering to the summit of the pileus which is expanded.—*Fred C. Werkenthin.*

373. Pierre, M. H. **Nouveau cas de rubéfaction de la face, survenu à la suite de l'ingestion du Corpinus atramentarius. [A new report of rubefaction of the face caused by eating Coprinus atramentarius.]** Bull. Trimest. Soc. Mycolog. France 34: 28. 1918.

374. Spegazzini, C. **Revision de las Laboulbeniales Argentinas. [Revision of the Laboulbeniales of Argentina.]** An. Mus. Nacion. Hist. Nat. Buenos Aires 29: 445–688. *Fig.* 1–213. 1917.—This is a continuation and revision of the author's work "Laboulbeniales Argentinas" which appeared in 1912. It is divided in two sections. The first section is general and gives methods for the collection of the forms and of the hosts on which the forms are found, methods of conservation, methods of mounting for permanent collections, of separation from the hosts and methods of staining. This section also includes a general review of the morphology and life cycle of the Laboulbeniales. Methods for the artificial cultivation are also given. The second section is concerned chiefly with the description of species and diagnostic notes with careful notes as to the hosts on which the various forms were found. Keys to the families are appended. Out of the 213 species described 90 are new species and a few are new forms.—*A. Bonazzi.*

375. Stevenson, John A. **A check list of Porto Rican fungi and a host index.** Jour. Dept. Agric. Porto Rico. 2: 125–264. 1918.

376. Trotter, A. **La "rabbia" o "antracnosi" del cece ed il suo produttore. [Rabbia or anthracnose of chick-pea and its cause.]** Revist. Patol. Veg. 9: 105–114. 1918.—An outbreak of the "rabbia" or anthracnose of the chick pea (*Cicer arietinum*) on the farm of the School of Viticulture at Avellino led to a new systematic study of the fungus causing this disease, already long known. The fungus previously known as *Zythia rabiei*, *Phyllosticta cicerina* and *Ascochyta pisi* is given the name *Phyllosticta rabiei* (*Passerini*) *Trotter.*—*F. M. Blodgett.*

377. Van der Bijl, Paul A. **Ring spot of cane leaves.** South Africa Dept. Agric. Bull. 10: 15–16. *Fig. 7.* 1918.—Brief description of *Leptosphaeria sacchari* in the leaves of sugar cane. The illustration shows the perithecia to be deeply imbedded and amphigenous.—*D. Reddick.*

378. VUILLEMIN, PAUL. **Un nouvel Aspergillus brun, Eurotium verrusulosum. [A new brown Aspergillus, Eurotium verruculosum.]** Bull. Trimest. Soc. Mycolog. France **34**: 76–83. *Fig. 1–4, 5–17.* 1918.—The author describes *Eurotium verruculosum*, a new species, isolated from spoiled carrots, to be distinguished from *Eurotium echinulatum* by not having brown appendages on the surface of the perithecia, and not having echinuate ascospores and conidia.—*Fred C. Werkenthin.*

379. VUILLEMIN, PAUL. **Sur les Mortierella des groupes polycephala et nigrescens. [A discussion of Mortierella polycephala and Mortierella nigrescens.]** Bull. Trimest. Soc. Mycolog. France **34**: 41–46. *Fig. 1–3.* 1918.—The author discusses and describes in detail *Mortierella polycephala* and *Mortierella nigrescens*, using three text figures to illustrate various points in the development of the first mentioned fungus.—*Fred C. Werkenthin.*

380. WAKEFIELD, E. M. **Fungi exotici. XXIV.** Kew Bull. Misc. Inf. **1918**: 207–210. 1918.—The following new species are described: *Fomes elegans* on living *Shorea robusta* from India, *F. pseudo-ferreus* on diseased roots of *Hevea brasiliensis* from Federated Malay States, *Aleurodiscus australiensis* from Australia, and the following from Tropical Africa: *Puccinia coreopsidis, Eutypella theobromicola, Rosellinia asperata, Septoria coffeae, Hendersonia protearum, Cercospora latimaculans.*—*D. Reddick.*

381. WAKEFIELD, E. M. **New and rare British fungi.** Kew Bull. Misc. Inf. **1918**: 229–233. 1918.—New species are *Lepiota nauseosa, Nectria fusco-purpurea, Cercosporella antirrhini* on living leaves and stems of *Antirrhinum, Helminthosporium warpuriae* on an injured stem of *Warpuria clandestina.*—Critical notes and descriptions of the following: *Merulius pinastri, Lysurus borealis, Mastigosporium album* var. *muticum.*—*D. Reddick.*

382. WAKSMAN, SELMAN A., AND ROLAND E. CURTIS. **The occurrence of actinomycetes in the soil.** Soil Sci. **6**: 309–319. 1918.—See Bot. Absts. **2**, Entry 1342.

PATHOLOGY

DONALD REDDICK, *Editor*

383. ANONYMOUS. **The control of pests of fruit trees in gardens and small orchards.** Jour. Bd. Agric. [London] **25**: 41–53. *3 fig.* 1918. Also issued as Food Production Leaflet No. 39.

384. ANONYMOUS. **Field experiments, 1918.** Jour. Dept. Agric. Ireland **19**: 180–208. 1919.—See Bot. Absts. **3**, Entry 195.

385. ANONYMOUS. **Analyses of materials sold as insecticides and fungicides.** New York Agric. Exp. Sta. [Geneva] Bull. 454. *15 p.* 1918.—Chemical analyses of various brands of insecticides and fungicides sold in the state of New York.—*F. C. Stewart.*

386. ANONYMOUS. **Practical hints on potato spraying.** Jour. Bd. Agric. [London] **25**: 198–203. 1918. Also published as Food Production Leaflet 43.—Prices of vitriol and soda, list of vendors, care and use of spraying machines, formulae, spraying dates for the various counties.—*D. Reddick.*

387. BALL, E. D. **The potato leafhopper and its relation to the hopperburn.** Jour. Econ. Entomol. **12**: 149–155. *Pl. 5, fig. 7.* 1919.—Results of study of hopperburn of the potato, *Solanum tuberosum* induced by the activities of the potato leafhopper, *Empoasca mali.* For the most part an entomological study and discussion of the disorder. however, discussing its relation to tipburn attributed to excessive transpiration. "I am with the plant pathologist in saying that there is no question but what some of the things they called tip-burn in the past were not this, but a large part of it was this." It is thought that the injury is not

mechanical but specifically, an infection or an injection. Control consists in applying a contact spray, as blackleaf 40, taking care to reach the lower surface of the leaves. Hopperburn occurs on other plants, as nursery stock, young apple trees, growing tips of raspberries etc.—*A. B. Massey.*

388. Board of Agriculture, Great Britain. **Potato spraying campaign.** Jour. Bd. Agric. [London] 25: 1004. 1918.—In the 10 months—November 1, 1917 to August 1, 1918—over 14,500 knapsack and other spraying machines were bought in Great Britain for the purpose of spraying potatoes. Between November 1, 1916 and August 1, 1917, 12,000 machines were bought. Previous to a campaign of the Food Production Department, the yearly average was less than 1000 machines.—In a demonstration experiment at Christchurch, blight was general on unsprayed plots on August 22 whereas on the sprayed plots it did not become general until September 17.—At digging time rod rows yielded healthy tubers as follows: sprayed, 345 pounds; unsprayed, 226 pounds.—*D. Reddick.*

389. Board of Agriculture, Great Britain. **The wart disease of potatoes order of 1918.** Jour. Bd. Agric. [London] 25: 212–215. 1918.—Infected area is defined. No person in infected area shall plant potatoes not of a variety approved by the board as immune to wart disease.—Sale of immune varieties for seed purposes is restricted by license.—Potatoes from infected areas are not to be used for planting outside the area.—Owners discovering the disease are required to report it.—Tubers visibly affected are not to be sold for any purpose.—Inspectors have right of search and may order potatoes destroyed if conditions warrant.—*D. Reddick.*

390. Byars, L. P. **A serious eelworm or nematode disease of wheat.** U. S. Dept. Agric., Circ. 114. *5 p., 2 fig.* 1918.—*Tylenchus tritici* has been found causing damage to wheat in United States. Present known distribution limited to states of Virginia and California.—Control measures are: use of disease-free seed, a 3-year rotation and sanitary precautions.—*D. Reddick.*

391. Byars, Luther P. **The eelworm disease of wheat and its control.** U. S. Dept. Agric. Farmers' Bull. 1041. *10 p., 10 fig.* 1919.

392. Carnot, P., and J. Dumont. **Technique d'étude de la pénétration des antiseptiques en milieux solides. [Technic for studying the penetration of antiseptics into solid substances.]** Compt. Rend. Soc. Biol. Paris 81: 1199-1200. 1918.—The appliance used consists of a porcelain cylinder placed in a Petri dish. The cylinder has a number of indentations about its base. A heavily inoculated agar culture of the test organism is poured into the Petri dish and after this has hardened the antiseptic is poured within the cylinder.—The diffusion takes place through the indentations in the base of the cylinder and after incubation the degree of diffusion and the activity of the antiseptic can be measured by noting the width of the clear zone about the cylinder.—An inorganic salt which will give a color reaction with some component of the antiseptic can be added to the agar if desired. [Abst. by G. H. S[mith] in Abst. Bact. 2, Entry 1946.]

393. Clinton, G. P. **Artificial infection of Ribes species and white pine with Cronartium ribicola.** Amer. Plant Pest Committee Bull. 2: 14–15. 1919.—Of 29 species and varieties of *Ribes* inoculated with aeciospores and urediniospores, infection was secured on all but five. Detached *Ribes* leaves, placed in inverted petri dishes produced uredinia in the case of 25 species of *Ribes* out of 35 that were tried. Infection takes place through the stomates. Success was obtained in maturing several other rusts on leaves in petri dishes.—Artificial infection of pines proved that infection is accomplished in the leaves by way of the stomates. Small golden yellow spots appear sometimes as soon as 25 days after inoculation in the greenhouse. Later a distinct band is formed around the leaf. Mycelium is abundant around the fibrovascular system in these golden yellow spots. Later the mycelium was found to follow the bundles into the stem.—*W. H. Rankin.*

394. Coit, J. E., and Robert W. Hodgson. The June drop of Washington navel oranges; a progress report. California Agric. Exp. Sta. Bull. 290. *P. 201-212.* 1918.—See Bot. Absts. 2, Entry 273.

395. Cotton, A. D. Diseases of parsnips. Jour. Bd. Agric. [London] 25: 61-71. 1918.—Slightly modified and abridged form of article published elsewhere. See Bot. Absts. 1, Entry 1612.—*D. Reddick.*

396. Detwiler, Samuel B. Status of white pine blister rust control in 1918. Amer. Plant Pest Committee Bull. 2: 4-11. 1919.—A summary of the results of field work conducted during 1918 in the United States and Canada. In the northeastern states the amount of infection on currants and gooseberries was not as heavy as in the previous two seasons. Many new pine infections centers were found. Bulk of white pines are as yet free from this disease. The removal of currants and gooseberries from stands of white pine throughout this area is advised. Results so far obtained are said to warrant this measure as practical. In Maine three demonstration control areas are in operation. The average cost for the removal of Ribes plants was $0.32 for the acre. In New Hampshire coöperative efforts resulted in removing Ribes from 66,652 acres at a cost of $0.39 an acre. A demonstration control area of 1790 acres was established. The average cost was $0.71 an acre. In Vermont two control areas were established one of 473 acres and the other of 3053 acres. The cost of Ribes eradication on the first area was $2.47 an acre due to difficult conditions. On the other area it cost on the average of $0.85 an acre. Work was continued in Massachusetts on several control areas. In one area of 8095 acres the cost was $0.60 an acre. In other areas totaling 10,611 acres, Ribes eradication cost $0.70 an acre. In Rhode Island a control area of 12,115 acres was established. Eradication of Ribes cost $0.28 an acre. Several check plots were rescouted and it was found that 97 per cent of the Ribes bushes had been removed. No control work was done in Connecticut in 1918. In New York State over a million wild Ribes were eradicated on 15 areas totalling 29,337 acres. The average cost was $1.46 an acre. A demonstration control area of 9344 was freed to the extent of 92 per cent of the Ribes plants, at a cost of $1.14 an acre.—The plants must be cut below the crown to prevent sprouting. Special tools were used for this purpose. Infected pines were found in three localities in Pennsylvania. None of these areas is close to native pine stands. Diseased pines were found in two nurseries and in an ornamental planting in New Jersey. In states south and west of Pennsylvania including Delaware, Maryland, Virginia, West Virginia, North Carolina, Ohio, Illinois, Indiana, Iowa, Kentucky, Tennessee, Missouri, Kansas, Nebraska, South Dakota and North Dakota, several thousand plantings of white pine were inspected as well as nurseries growing white pine but no blister rust was discovered. The rust was found in imported pines in one locality in Michigan. Scouting showed the disease present in 10 counties in northern Wisconsin. Surveys in Minnesota showed no new centers that were not known the previous season. In both Wisconsin and Minnesota it is the policy to remove all the pines in and adjacent to infection centers and also, so far as possible to eradicate Ribes in the vicinity of infections. No blister rust was found in the western states. In Quebec Province, Canada, the disease was found in one county on the north shore of the St. Lawrence River. The rust was abundant in southern Ontario but could not be found in northern Ontario. Surveys in New Brunswick, Manitoba, Saskatchewan, Alberta and British Columbia revealed no blister rust. Wild and cultivated Ribes are continuous from Ontario to Alberta. Three experimental areas were established in Quebec and Ontario to determine if white pine can be grown successfully in areas where the disease is present. Ribes are being removed from these areas. A table is appended to this report summarizing the number of Ribes plants to the acre and cost of eradication work for different types of woodland on nine demonstration control areas in the northeastern states.—*W. H. Rankin.*

397. D'Herelle, E. Technique de la recherche du microbe filtrant bactériophage (Bacteriophagum intestinale). (Technic for isolating a filtrable organism (Bacteriophagum intestinale) which is bacteriophagous.) Compt. Rend. Soc. Biol. Paris 81: 1160-1162. 1918.—The organism, *Bacteriophagum intestinale,* possesses a definite antagonistic action toward

B. dysenteriae. The organism may be isolated from dysenteric stools by filtration and cultivation in the presence of *B. dysenteriae.*—[Abst. by G. H. S[mith] in Abst. Bact. 2, Entry 2058.]

398. Doé, Fr. **La conversion en futaie et l'oïdium.** [Conversion into high forest and the oidium.] Rev. Eaux et Forets 57: 53–59. 1919.—See Bot. Absts. 3, Entry 2.

399. Federal Horticultural Board, U. S. Dept. Agric. **Amendment No. 1 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements 60: 21–22. 1919. Also U. S. Dept. Agric., Office of Secretary, Unnumbered leaflet, February, 1919.—Regulation 3 is amended so that bulbs, stocks, cuttings, seeds, etc., may be admitted if packed in soil or sand which has been sterilized under supervision of a duly authorized inspector.—*D. Reddick.*

400. Federal Horticultural Board, U. S. Department of Agriculture. **Amendment No. 2 to regulations supplemental to notice of quarantine No. 37.** Service and regulatory announcements 61: 33. 1919. Also U. S. Dept. Agric., Office of Secretary, Unnumbered leaflet, March 27, 1919.—Regulation 14 is amended to read "Special permits for importation in limited quantities of prohibited stock." Safeguards are to be prescribed in the permits as issued. This amendment is for the purpose of keeping the country supplied with new varieties and necessary propagating stock.—*D. Reddick.*

401. Federal Horticultural Board, U. S. Dept. Agric. **Nursery stock, plant and seed quarantine. Notice of quarantine No. 37, with regulations.** Service and regulatory announcements 57: 101–110. 1919.—This quarantine, effective June 1, 1919, supersedes present regulations governing the importation of nursery stock and brings under restriction all other plants or plant products for or capable of propagation. Such products as fruits, vegetables and cereals intended for medicinal, food or manufacturing purposes and field, vegetable and flower seeds are exempt.—Certain bulbs, rose stocks, fruit stocks, including cuttings, scions and buds, and seeds of nut, fruit, forest, and other ornamental and shade trees and of hardy perennial ornamental shrubs may be imported under permit, the terms of which are as follows: they must be free from sand, soil, or earth and they must originate in countries which maintain inspection. The U. S. Department of Agriculture may import any plant or plant product for experimental or scientific purposes.—*D. Reddick.*

402. Hutt, Harry. **Dry rot from the architect's point of view.** Jour. Bd. Agric. London 25: 166–176. *3 fig.* 1918.—This article does not attempt to deal with the various forms of fungi which cause dry rot in timber. Investigations were made showing that in the majority of cases where dry rot was found, the work had been carried on without the supervision of an architect. In order to decrease the loss due to this disease the author suggests that all workmen should receive special instruction on the conditions conducive to the production of dry rot, and methods of construction that should be used to prevent it. Conditions favorable for growth of the fungus, and measures of control are given. The instructions given are mainly the sanitary measures employed for the control of fungus diseases.—*J. Norma Anderson.*

403. Johnson, James, and R. H. Milton. **Strains of White Burley tobacco resistant to root-rot.** U. S. Dept. Agric. Bull 765. *11 p., fig. 1–4.* 1919.—The purpose of the bulletin is to show the incorrectness of the commonly accepted explanations of tobacco "exhausted" soils in the Burley section of Kentucky and adjoining states. Root-rot (caused by *Thielavia basicola*) is an important factor in determining systems of tobacco soil management. It is one of the causes of yellowing and improper growth in seed beds. Low temperatures (60° to 75°F.) favor, while high soil temperatures (80° to 100°F.) practically prevent development of the parasite. Thus, in relatively warm seasons diseased plants may partially or wholly recover. In the Burley region rotation is practiced yet "sick" soils obtain; "healthy" soils are first contaminated by the transfer of the fungus by wind, water or animals. In order to

overcome the trouble, and still grow the desired White Burley, the authors present results of selecting for disease resistance. Individuals which remained healthy on "sick" soil were selected, propagated and tested over a period of several years. Under varied conditions these strains have maintained their original degree of resistance. The resistant strain is practically equal to the ordinary Burley in quality (color and texture) of the cured product. It also brings as good price on the warehouse floor as the ordinary Burley. For "sick" soils, the resistant Burley strains are advised for White Burley districts; for "healthy" soils the ordinary Burley may be preferred. [See Bot. Absts. 3, Entry 43.]—*L. R. Hesler.*

404. Johnston, J. R., and Stephen C. Bruner. **A Phyllachora disease of the royal palm.** Mycologia **10**: 43–44. *Pl. 2.* 1918.

405. Lathrop, F. H. **Leaf-hoppers injurious to apple trees.** New York Agric. Exp. Sta. [Geneva] Bull. **451**: 185–200. *Pl. 1–4, fig. 1–2.* 1918.—Consists, chiefly, of a discussion of the distinguishing characteristics, seasonal activities, and life stages of three species of leaf-hoppers which attack the cultivated apple [*Malus sylvestris*], *viz.*, *Empoasca Mali* LeBaron, *E. unicolor* Gill., and *Empoa rosae* L. On pages 195–198 there is an account of some experiments the object of which was to ascertain the rôle of these insects in the transmission of the fire blight disease caused by *Bacillus amylovorus*. The insects were first permitted to feed for a time on blighted apple shoots after which they were transferred to cages containing healthy shoots. Positive results were obtained with *E. Mali;* but the other two species gave negative results, except in one doubtful instance. The behavior of the insects indicated that the diseased tissue was distasteful and injurious to them.—*F. C. Stewart.*

406. Lee, H. A. **Copper stearate.** Ann. Rept. Agric. and Hortic. Res. Sta. Univ. Bristol **1917**: 39–42. [1918.]—If copper sulfate solution is added to soap solution an opaque light blue precipitate appears, the individual particles of which measure 2–3μ. Both solutions must be dilute (1 per cent) and the soap must be in excess. If much more than 20 cc. of copper sulfate solution is added to 100 cc. of soap solution a sticky mass is formed. The chemistry of the mixture is discussed. It wets resistant surfaces and combined with 2 per cent paraffin emulsion will wet such surfaces as mildew spots. Once dried on foliage it resists wetting completely. Its fungicidal properties have not been determined.—*D. Reddick.*

407. MacMillan, H. G. **Fusarium-blight of potatoes under irrigation.** Jour. Agric. Res. **16**: 279–303. *Pl. 37–41.* 1919.—Report of the investigations made in the Greeley, Colorado district during the years 1915, 1916, 1917 of the disease commonly known as "potato-wilt," "Fusarium-wilt," etc. The term "Fusarium-blight" is suggested as being more applicable to all stages of the disease. *Fusarium oxysporum* was found to bring about all phases of the disease; other species of *Fusarium* were found to bring about *similar* phenomena. Remarkable symptoms of the disease noted are, (a) wilting and dying of a single leaf while the remainder of the plant remains healthy, (b) evidence of the disease "when the first leaves appear," (c) passing of a plant from health to complete collapse within two days, and, (d) rolling of the leaves without the usual wilting. The soil, not the seed, is the principle source of the inoculum. Seed pieces furnish an important avenue of attack, injured surfaces being much more vulnerable than uninjured ones. Certain Rural varieties were found remarkably susceptible and certain Pearl varieties remarkably resistant to the disease.—Selection for resistance, superior cultural practice, and the use of whole seed free from wounds are suggested as control measures.—*Charles R. Stevenson.*

408. Martin, Walter. **The physical factors influencing infection.** Ann. Surg. Philadelphia, **68**: 436–445. 1918.—A general discussion of wound infection, placing emphasis upon the importance of pressure at the focus of infection, the presence of foreign bodies, the effect of devitalized and necrotic tissues, and the presence of dead spaces in the wound. [Abst. by G. H. S[mith] in Abst. Bact. 2, Entry 2150.]

409. McCubbin, W. A. **Investigation in the Canadian Department of Agriculture.** Rept. White Pine Blister Rust Control, Amer. Plant Pest Committee Bull. 2: 13-14. 1919.—Sunlight filtered through glass to remove its ultra-violet content did not materially affect germination of spores of *Cronartium ribicola* even after five hours exposure. Both aeciospores and urediniospores readily fall victims to ultra-violet radiations, however, at an exposure of 2.5 minutes to the radiations from a source whose ultra-violet energy may be represented by 0.38. In 22 woodlots in Niagara district blister rust was present in 19. An average of 2.3 per cent of the trees were found infected; the highest percentage infection was 33.54 in one woodlot. In 10 plantations at Oakville where disease has been present since 1915, one pine out of 2249 was found diseased. In Simcoe county where the fungus has existed since 1912 no diseased pine could be found in three plantations of 600 trees. Author believes that about 1 per cent of the pines under conditions favorable to infection, will become infected each year.—*W. H. Rankin.*

410. Mestrezat, W., and Th. Casalis. **Propriétés antiseptiques et mode d' emploi du monochlorure d'iode. [The antiseptic properties and the method of use of monochloride of iodine.]** Compt. Rend. Soc. Biol. Paris 81: 1196-1199. 1918.—Solutions of iodine chloride possess a high antiseptic property and are harmless to the tissues. The solution is used in a concentration of 0.3 gram per liter. [Through absts. by G. H. Smith] in Abst. Bact. 2, Entries 1952 and 1953.]—*D. Reddick.*

411. Metcalf, Haven. **Summary of the white pine blister rust situation.** Rept. White Pine Blister Rust Control, Amer. Plant Pest Committee Bull. 2: 16. 1919.—The cost of removing wild currants and gooseberries is low and will not compare with the cost of the damage if the bushes are permitted to remain and spread infection to the pines. Resumption of planting white pine in East is warranted. *Ribes* must be eradicated from the planting area and the plantation kept free of Ribes during subsequent years. The wisdom of state and national quarantines confirmed by the demonstrated fact of the over-wintering of the fungus on *Ribes*. These state and national quarantines must continue to be rigidly enforced for an indefinite period.—*W. H. Rankin.*

412. Monziols, M. **Procédé de désinfection absolue des mains en trois minutes par une pate a base de chlorure de chaux. [Method of securing an absolute disinfection of the hands in three minutes by the use of a paste of calcium chlorite.]** Compt. Rend. Soc. Biol. Paris 81: 600-602. 1918.—The formula for the paste is:

	grams
Calcium chloride	2
Sodium carbonate	2
Boric acid	10
Talc	10

—[Abst. by G. H. S[mith] in Absts. Bact. 2, Entry 1918.]

413. Norton, J. B. **Washington asparagus: information and suggestions for growers of new pedigreed rust-resistant strains.** U. S. Dept. Agric., Office Cotton, Truck and Forage Crop Diseases, Circ. 7. *P. 8.* Washington [D. C.], 1919.

414. Paravicini, E. **Favolus europaeus Fr. Ein Schädling des Nussbaumes. [An enemy of the nut trees.]** Schweiz. Zeitschr. Forstwesen 70: 15-17. 1919.—Since the culture of nut trees has assumed commercial importance in Switzerland, the enemies of the nut tree must be controlled. *Juglans regia L.* is subject to attack by the following fungi: *Polyporus sulfureus, P. imbricatus, P. squalmosus, P. cinnabarinus, P. fomentarius, P. ignarius, P. hispidus, Daedalea cinnabarina, Agaricus ostreatus,* and *Favolus europaeus.*—*Favolus europaeus* has been found to be the most virulent. This fungus has been found in various parts of Switzerland, which indicates that it may become a serious factor.—The method of infection has not been experimentally determined, but it is known that the fungus enters through wounds in the branches.—The only method of control known is to remove all diseased branches and cover the wound with grafting wax.—*J. V. Hofmann.*

415. Perkins, Joseph A. **Preliminary report of a method for estimating in vivo the germicidal activity of antiseptics.** Ann. Surg. Philadelphia 68: 241–244. 1918.—The count of organisms secured by culture from the wound is regarded as more accurate than counts made from smear preparations.—The applications of disinfectants (chlorinated compounds) to the wounds caused marked drops in the plate counts.—(Abst. by G. H. S[mith] in Abst. Bact. 2, Entry 1947.]

416. Regan, W. S. **Progress of experiments for destroying Ribes with chemicals.** Rept. White Pine Blister Rust Control, Amer. Plant Pest Committee Bull. 2: 15–16. 1919.—Undiluted fuel-oil applied as a fine spray to foliage and twigs produced defoliation and under favorable conditions the bark was penetrated and the bushes killed. Two or three applications were necessary to kill skunk currants in the shade. Other less effective foliage sprays tested included sodium arsenite, salt solution, kerosene and several proprietary mixtures. One of the latter at 1 to 60 strength killed the foliage of skunk currants in 5 hours in a sunny exposure; 1 to 40 strength killed the foliage in 15 minutes. Of several liquids and oils applied at the base of the bushes, "dip" oil has given the most satisfactory results. —*W. H. Rankin.*

417. Spaulding, Perley. **Investigations in the United States Department of Agriculture.** Rept. White Pine Blister Rust Control, Amer. Plant Pest Committee Bull. 2: 11–13. 1919.—Investigations carried on at Block Island, Rhode Island; Kittery Point, Maine; North Conway, New Hampshire, and Lewis, New York. Aeciospores of *Cronartium ribicola* were caught in traps at an altitude of 2700 feet above the nearest known source of spores which was five and one-half miles distant. Spore-traps 20 feet above fruiting cankers caught many more spores than did traps at either side or below. Aeciospores are disseminated for miles away from their source; they retain their viability for weeks and show a higher percentage of germination than the other spores. Urediniospores were found by spore-traps to be limited in their dissemination to a distance of one to three hundred yards.—At Lewis, New York, rain periods were followed in due time by new generations of spores on Ribes. Seven distinct generations were noted. Sporidia abundantly produced in September and thereafter. These spores were caught at no distance over 200 feet from the infected bushes.—Evidence seems to warrant the belief that a Ribes-free zone of from 100 to 600 yards according to topographic and other conditions will protect pines from infection. Urediniospores from over-wintered leaves under bushes were used in successful infection experiments in March (See Phytopath. 8: 617–619. 1918).—*W. H. Rankin.*

418. Thomas, C. C. **Seed disinfection by formaldehyde vapor.** Jour. Agric. Res. 17: 33–39. *1 fig.* 1919.—The danger involved in treating many kinds of seeds with liquid disinfectants led to trials with formaldehyde vapor. The seeds are spread out on trays and covered tightly. A small jet of steam is admitted to the container and formaldehyde is injected into the steam intake by air pressure. The film of condensation water about the seeds evaporates quickly setting free the gas.—Various kinds of seeds were tested and none was injured materially by treatment for 2 hours with formaldehyde used at the rate of 30 ounces of solution (40 per cent) to 1000 cubic feet. Under similar conditions masses of bacteria and of spores of several parasitic fungi were killed by using 20 ounces of formaldehyde to 1000 cubic feet. Masses of spores of four species of *Fusarium* were not killed when subjected to treatment for 2 hours with vapor at the rate of 30 ounces to 1000 cubic feet.—*D. Reddick.*

419. Weldon, G. P. **Pear blight epidemic in mountain countries.** Month. Bull. California Comm. Hortic. 7: 459. 1918.—Pear blight (*Bacillus amylovorus*) was very severe in higher altitude sections of California, places where, before this season (1918), it was scarcely known.—*D. Reddick.*

420. Winston, G. R., and H. R. Fulton. **The field testing of copper-spray coatings.** U. S. Dept. Agric. Bull. 785. *9 p., fig. 1–4.* 1919.—The authors point out that varying local conditions make the spray calendar inadequate, and therefore a suitable chemical test of the

spray coating seems desirable in determining proper time for renewal of applications. The method, which is fully described, consists in making comparisons between washings from sprayed leaves and a series of known dilutions of a standard copper solution. By the same method one may be assisted in correcting faulty spraying practices, either in preparation of the mixture or manner of application.—*L. R. Hesler.*

421. Wormald, H. **Brown rot of apples.** Jour. Bd. Agric. [London] 25: 299-302. *Fig. 1-3.* 1918.—Brief description of brown rot as caused by *Monilia fructigena* Pers. (*Sclerotinia fructigena* Schroeter) is given. The life history of the parasite is also summarized. Overwintering is said to occur in mummied apples hanging to the tree. Conidia produced in the summer, and which remain on the pustules or are carried away, usually lose their vitality.—The fungus enters fruits through wounds, such as are produced by biting insects. The fungus may, on some soft-wooded varieties, pass from the affected fruit into the fruiting spur and even into the branch forming a canker around the base of the spur. In this respect it resembles the disease of apple produced by a closely related species, *Monilia cinerea* Bon. (see Jour. Bd. Agric. 24: No. 5). Cases where affected fruits turn black, the skin remaining smooth or nearly so and bearing few or no pustules, are described, but the conditions effecting such symptoms have not been determined. Removal of affected fruits, spurs and cankered areas is advised.—*L. R. Hesler.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

422. Abbott, W. S. **A study of the effect of storage, heat, and moisture on Pyrethrum.** U. S. Dept. Agric. Bull. 771. *6 p.* 1919.—Various experiments on whole and ground flower heads of *Pyrethrum cinerariaefolium* (Trev.) showed that their efficiency as an insecticide was more lasting in the whole than in the powdered condition.—*A. R. Bechtel.*

423. Anonymous. **Mexico's little known botanicals.** Pharm. Era 52: 58. 1919.—A correspondent submits a list of ten drug plants giving the Mexican names, botanical nomenclature, and the names of the states in which they grow.—*Oliver A. Farwell.*

424. Anonymous. **Geography of U. S. botanical drugs.** Pharm. Era 52: 63-66, 89-92. *9 fig., 2 maps.* 1919.—An attempt is made to give the geographical source of the botanical drugs of the United States Pharmacopoeia and of the National Formulary. The greater number of these plants are indigenous to the Western Hemisphere and most of these to U. S. A.; it is pointed out that many of them are likewise admitted to the pharmacopoeias of other countries and that still others have a more or less commercial demand for use abroad. The cultivation of drug-plants for commercial purposes received an added stimulus as a result of the war and scarcity of supplies but as an industry the cultivation of plants has yet to be developed. It is said that the vegetative regions of North America correspond very closely to those of the northern half of the Eastern Hemisphere and that the character of the vegetation is determined by the alternation of summer and winter heat and by man himself. The different regions are contrasted and the more important commercial pharmaceutical plants in each are listed and plotted for the Western Hemisphere. The necessary information regarding climatic and soil conditions, plant idiosyncrasies, and financial resources, and control of a strictly limited market, to make cultivation of drugs a success is indicated.—*Oliver A. Farwell.*

425. Beringer, G. M. [Rev. of: Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 6. Published by the Government of the State of New South Wales.] Amer. Jour. Pharm. 91: 328-329. 1919.

426. Bourquelot, Em., and H. Hérissey. **Application de la méthode biochimique à l'étude des feuilles d'Hakea laurina. Extraction d'un glucoside (arbutin) et de québrachite. [Biochemical methods applied to the study of the leaves of Hakea laurina. Extraction of arbutin and quebrachite.]** Compt. Rend. Acad. Sci. Paris 168: 414–417. 1919.—Leaves of *Hakea laurina* R. Br. (an Australian tree of the *Proteaceae*), which is cultivated as an ornamental tree in France, were examined chemically and two glucosides as well as quebrachite, were found. Arbutin and quebrachite were isolated. Treatment of leaf preparations with invertase and emulsin demonstrated the presence of sucrose and a hydrolyzable glucoside. It is noted that arbutin and quebrachite were also found together in the leaves of *Grevillea robusta* A. Cunn., another member of the *Proteaceae*.—*V. H. Young.*

427. Ewe, George E. **Notes on emetine hydrochloride.** Amer. Jour. Pharm. 91: 275–280. 1919.—The examination of samples of emetine hydrochloride, representing the products of five American manufacturers, showed that a pale reddish-purple color, followed rapidly by a brown and finally a light green was obtained in each case, whereas the United States Pharmacopoeia states that no purple color should be produced, indicating the absence of considerable proportions of cephaeline. Quantitative determinations were made to ascertain if the amount of cephaline present was dangerously great, with the following results: Sample No. 1, 1.65 per cent; No. 2, 3.10 per cent; No. 3, 2.1 per cent; No. 4, 0.80 per cent; No. 5, 2.10 per cent. Judging from this, if the rule were interpreted literally it would exclude the majority of emetine hydrocloride on the market. A quantitative test, as suggested by the author, should be resorted to; the adoption of an upper limit of 3 per cent of cephaeline would insure the absence of excessive proportion of cephaeline in the emetine hydrochloride. A series of experiments were performed to note the effect of heat, light, acidity and tin on emetine hydrochloride, with the following results. Crystallized emetine hydrochloride practically withstands sterilization temperatures; diffused sunlight for a number of weeks is required to just appreciably darken solutions of emetine hydrochloride, and direct sunlight of at least three hours duration is required to just appreciably darken solutions; titration for acidity is to be preferred to the United States, Pharmacopoeia litmus test; metallic tin acts similarly to a soluble alkali in liberating the alkaloid from solutions of emetine hydrochloride, the time required, however, being prolonged.—*Anton Hogstad, Jr.*

428. Heckel, James E. **Modern paint vehicles.** Amer. Jour. Pharm. 91: 287–297. 1919. —As the annual production of flax in the United States is insufficient and has been decreasing for the last decade, especially during the past two or three years, it is desirable to devise means to overcome this shortage.—The solution of the problem might be attained in any of three ways: increasing flax production; importing enough flax-seed to make up the shortage; or using other oils to eke out. The three questions are discussed by the author, the main emphasis being placed on the use of other oils. A comparison of various oils is given, such as perilla, hempseed, lumbang ("Kukui" or candlenut), soy bean, china wood, menhadden and poppyseed.—*Anton Hogstad, Jr.*

429. Lloyd, Francis E. **The origin and nature of the mucilage in the cacti and in certain other plants.** Amer. Jour. Bot. **6**: 156–166. 1919.—See Bot. Absts. **3**, Entry 442.

430. Mirande, Marcel. **Sur les réactions michrochimiques et les localizations de l'alcaloide de l'Isopyrum thalictroides. [Concerning the michrochemical reactions and localization of the alkaloid of Isopyrum thalictroides.]** Compt. Rend. Acad. Sci. Paris **168**: 316–317. 1919. —Harsten in isolated the alkaloid isopyrine from *Isopyrum thalictroides* 1872. By means of microchemical studies author locates the alkaloid principally in definite regions of the roots and rhizomes, although it was also located in lesser amounts in the stems and petioles. This alkaloid appears to be distinct from that demonstrated by MacDougal (1896) in an American species, *Isopyrum biternatum*.—*V. H. Young.*

431. Riley, W. J. **A use of galls by the Chippewa Indians.** Jour. Econ. Entomol. **12**: 217–218. 1919.—The writer calls attention to the fact that Chippewa Indians made use of

galls produced by a species of *Eriophyes* on sumac. *Rhus copallina* and *R. glabra*, a fact that was overlooked by Miss Fagan in her paper on the uses of insect galls (Amer. Nat. 52: 155–176. 1918).—These galls occur abundantly in Minnesota and are collected in late summer by the medicine men, who use them in an infusion as a remedy for diarrhoea and in poultice for the treatment of burns.—*A. B. Massey.*

432. Schmidt, Elsa. **A new method for a separate extraction of hydrastine and berberine from golden seal on a large scale, and a review study of the two alkaloids.** Amer. Jour. Pharm. 91: 270–275. 1919.—The paper deals with the separate extraction of hydrastine and berberine, the hydrastine being extracted by the use of benzol and the berberine by hot water acidulated with acetic acid, after the extraction of the hydrastine. The author also gives methods for the estimation of these two alkaloids, tests for same, method for detection in plants and a few notes on the properties and uses of these two alkaloids.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

433. Collins, S. Hoare. **Plant products and chemical fertilizers.** *xvi+296 p.* Bailliere, Tindall and Cox: London, 1918.—This is one of a series of books proposed on "Industrial Chemistry." The present volume is divided about equally into four parts as follows: (1) fertilizers, (2) soils, (3) crops, and (4) the production of meat. In the third part is included most of the plant physiological material and the various sections represent the subject under the following captions: photosynthesis, the carbohydrates produced in crops, the oil-bearing plants, the nitrogen compounds in plants, miscellaneous plant products, and produce variability.—*B. M. Duggar.*

DIFFUSION, PERMEABILITY

434. Stiles, Walter, and Ingvar Jörgensen. **On the relation of plasmolysis to the shrinkage of plant tissue in salt solutions.** New Phytol. 18: 40–49. *Fig. 1–2.* 1919.—This is essentially an answer to D. Thoday's paper (New Phytol. 17: 108. 1918).—*I. F. Lewis.*

435. Waynick, D. D. **The chemical composition of the plant as further proof of the close relation between antagonism and cell permeability.** Univ. California Publ. (Agric. Sci.) 3: 135–243. *Pl. 13–24, fig. 1–26.* 1918.

WATER RELATIONS

436. Gray, John, and George J. Peirce. **The influence of light upon the action of stomata and its relation to the transpiration of certain grains.** Amer. Jour. Bot. 6: 131–155. *Fig. 1–18.* 1919.—The work of F. Darwin and of Lloyd on the action of stomata is briefly reviewed. In the present paper the action of the stomata is studied in wheat, oats, rye, barley and wild oats (*Avena fatua*), growing in moist soil, in saturated soil and in dry soil, and under different degrees of temperature, humidity and illumination. Direct observations and measurements of the stomatal aperture were made in the living leaf by fastening it gently to the stage of a microscope.—The opening and closing of the stomata depend chiefly upon light, since they were found to open in light and to close in darkness, almost independently of other factors. An increase or decrease in the amount of light has a corresponding effect upon the width of the stomatal openings. If the amount of water in the soil falls below the minimum needed to maintain the turgidity of the guard cells, however, they will remain closed regardless of the illumination. Wild oats in the greenhouse behave essentially like the other species studied, but, unlike them, when grown out of doors, the stomata close in the middle of

the day on bright days. This difference is ascribed to the xerophytic environment under which the wild oat normally grows. The moisture, soil and light requirements and the stomatal behavior of the cultivated species studied were essentially the same, though not identical. The authors call attention to the fact that light, the factor which regulates the rate of food manufacture, also regulates the opening of the stomata through which raw material for food manufacture enters.—*E. W. Sinnott.*

MINERAL NUTRIENTS

437. Skinner, J. J., and F. R. Reid. **The influence of phosphates on the action of alpha-crotonic acid on plants.** Amer. Jour. Bot. 6: 167–180. *Fig. 1–9.* 1919.—Alpha-crotonic acid, even in low concentrations, is harmful to plants. The action of nutrient salts in counteracting this effect was studied. Wheat plants were grown in a nutrient solution of calcium acid phosphate, sodium nitrate and potassium sulphate, one set with and another without crotonic acid. The familiar "triangle" system was used to study the effect of various proportions of nitrate, phosphate, and potash. The green weight of plants produced after 12 days was determined. Crotonic acid was found to depress this weight on the average of 52 per cent, but to have a much less harmful effect in solutions high in phosphate than elsewhere. To determine whether the calcium or the phosphate or both were important in causing this effect, sodium salts were substituted for calcium. Mono-, di- and tri-sodium phosphates, respectively, were used, the other members of the solutions remaining unchanged. Mono-sodium phosphate was similar in its effects to mono-calcium phosphate. Di- and tri-sodium phosphates, however (which are alkaline rather than acid in reaction), when in relatively strong concentration, counteract even more markedly the harmful effect of the crotonic acid. The effect of crotonic acid is therefore much ameliorated by the presence of phosphate and is less severe in solutions containing alkaline salts.—*E. W. Sinnott.*

METABOLISM (GENERAL)

438. Bourquelot, Em., and H. Hérissey. **Application de la methode biochemique a l'étude des feuilles d'Hakea laurina. Extraction d'un glucoside (arbutin) et de québrachite. [Biochemical methods applied to the study of the leaves of Hakea laurina. Extraction of arbutin and quêbrachite.]** Compt. Rend. Acad. Sci. Paris 168: 414–417. 1919. [See Bot. Absts. 3, Entry 426.]

439. Combes, Raoul. **Recherches biochemiques expérimentales sur le rôle physiologique de glucosides chez les végétaux. [Biochemical investigations on the physiological rôle of glucosides in plants.]** Rev. Gen. Bot. 29: 321–350, 353–376. *Pl. 1–3.* 1917. *Ibid.* 30: 5–16, 33–50, 70–93, 105–106, 146–157, 177–205, 226–238, 245–270, 283–301, 321–322, 355–364. *Pl. 14, 15, 16, 18.* 1918.—This paper, which gives the facts gained during a period of nearly ten years of experimental work, contains a review of the general history of glucosides; a discussion of some new external and internal factors that determine the glucoside content of the plant; with a detailed account of new apparatus, its use, and the results of experiments. The plants were grown under sterile conditions throughout the period of experimentation, by the strict sterilization of seeds, media, and all apparatus. Small plants were cultivated in special tubes so that the gas they used was sterile, being allowed to circulate through cotton stoppers. Knop's medium with and without the addition of a specific glucoside was used as the principal culture medium. These nutrient media were made solid when necessary by the addition of 5 per cent gelatine or pumice. At the end of the culture period the sterility of the medium was tested by bouillon inoculation. This was followed by a quantitative analysis of the medium, the plant stem, and the plant root, which gave data on the absorption and excretion of material. Plants grown under sterile conditions such that their roots were in contact with a nutrient medium containing a specific glucoside behaved according to the species to which they belonged. Thus *Agrostemma Githago* grew in solutions containing from 1 to 10 per cent of agrostemma saponin (extracted from Agrostemma seeds) without showing any signs of suffering, while plants not related to this species (*Polygonum* and *Raphanus*) grew only in 0 to 0.1 per cent

solutions of this glucoside. The disturbing effect of agostemma saponin on the latter plants was shown by the death and falling of the root hairs, the coralloid aspect of the radical, and the decrease in the production of dry material. The fact that *Agrostemma Githago* will grow in solutions containing 1000 times more agrostemma saponin than species of plants that do not produce this glucoside, indicates the immunization of *Agrostemma Githago* against its glucoside. In like manner saponin had a toxic effect on *Oenothera*, but did not affect *Saponaria* which produces this glucoside. Amygdalin was toxic and decreased the production of dry material in *Raphanus sativus, Vicia sativa, Vicia macrocarpa*, and *Polygonum*. Vicianin was not toxic for *Vicia*. Amygdalin was not absorbed nor used by the radish as a source of nitrogen or carbon. *Vicia* was not permeable to amygdalin nor agrostemma saponin. *Agrostemma Githago* could not absorb nor use agrostemma saponin as a food. One is not justified in concluding that glucosides play no rôle in the plant and are simply waste products, from the fact that they cannot penetrate the roots.—*Dean A. Pack.*

440. Hulton-Frankel, Florence, Helene Barber, and Eleanore Pile. **Studies on synthetic mediums. I. Study of the characteristics of some bacteria on a simple synthetic medium.** Jour. Infect. Diseases 24: 9–16. 1919.—A synthetic medium having the following constituents, with water to make one liter:—

cc.		cc.	
129.5	Molar H_3PO_4	100.0	Molar KOH
18.8	Molar CH_3COOH	10.0...0.01	per cent Fe_2Cl_6
17.8	Molar NH_4OH	10.0...0.01	per cent $MgSO_4$
100.0	Molar NaOH	10.0...0.01	per cent $CaCl_2$

A hydrogen-ion concentration of $10.^{-7}$. N is suitable for the growth of most saprophytic bacteria and some facultative parasites. None of the characteristics of the organisms were lost from growth on the synthetic medium. [See also next following Entry, 441.]—*Selman A. Waksman.*

441. Hulton-Frankel, Florence, and Helene Barber. **Studies on synthetic mediums. II. Sugar fermentations in synthetic mediums.** Jour. Infect. Diseases 24: 17–18. 1919. —The same formation of acid and gas, with very few exceptions, was obtained for a number of bacteria by using different sugars in broth and in a synthetic medium, the composition of which has been given. [See also next preceding Entry, 440.] The use of the synthetic medium presents special advantages in routine field work.—*Selman A. Waksman.*

442. Lloyd, Francis E. **The origin and nature of the mucilage in the cacti and in certain other plants.** Amer. Jour. Bot. 6: 156–166. 1919.—The mucilage of *Opuntia*, of certain Malvaceae, and of *Astragalus gummifer* was studied. The mucilage cells in *Opuntia* are scattered through the cortical and medullary parenchyma, the exact distribution varying somewhat with the species. They are almost entirely absent from the primary growing point, being secondary in origin and arising first in the medulla and later in the cortex. They are first recognizable by their large size. The walls, at first like those of the adjacent cells, soon become thickened by the change of their inner zone from ordinary cellulose to hydrocellulose. It is from this zone that the mucilage arises; and as the layer of mucilage swells it compresses the protoplasm toward the center of the cell, except at the pits, where the wall is not hydrolyzed and where projections of the protoplasm remain in contact with it. A treatment of tissue with anaesthetics caused an abundant oozing of mucilage, due to the fact that the parenchyma cells around the mucilage cells become asphyxiated and gave up their water into the intercellular spaces, whence it was used in hydrating the mucilage cells. Starch is found in the protoplasts of the mucilage cells, a fact which indicates that the protoplasts may remain alive. The mucilage layer shows lamination, which the author believes to be due to varying degrees of hydration or to a layering in the original cellulose wall. He brings forward evidence that the mucilage is neither laid down as a secondary layer, nor secreted within the protoplast or on its surface, but that it is strictly a development of the primary wall of the

cell. He discusses the views of previous workers as to the origin of mucilage.—The mucilage of *Opuntia* is hydrolyzed by various acids and submits slowly to the digestive action of organisms, gradually losing its viscosity. The effect of various stains upon mucilage was studied. Some were adsorbed vigorously, others less so and others not at all. The degree of adsorption is related to the degree of hydration. The viscosity of the mucilage was found to be lowered by those dyes which are adsorbed, "at a rate and to an extent in direct relation to the degree of adsorption."—*E. W. Sinnott.*

443. Magoon, C. A., and J. S. Caldwell. **A new and improved method for obtaining pectin from fruits and vegetables.** Science 47: 592–594. 1918.

444. Mirande, Marcel. **Sur les réactions michrochimiques et les localizations de l'alcaloide de l'Isopyrum thalictroides. [Concerning the microchemical reactions and localizations of the alkaloid of Isopyrum thalictroides.]** Compt. Rend. Acad. Sci. Paris **168**: 316–317. **1919.** —See Bot. Absts. 3, Entry 430.

445. Molliard, Marin. **Production d'acide citrique par le Sterigmatocystis nigra. [Production of citric acid by Sterigmatocystis nigra.]** Compt. Rend. Acad. Sci. Paris **168**: 360–363. 1919.—Wehmer (1893) created the genus *Citromyces* on the basis of the fact that certain fungi produced citric acid under certain conditions. It was considered that this fact was of significance in denoting relationship and that the production of citric acid was of the same significance as the formation of oxalic acid in *Aspergillus, Penicillium*, and *Sterigmatocystis*. Experiments by the author show that conditions unfavorable to the growth of the mycelium of *Sterigmatocystis nigra* and especially a small amount of nitrogen compared with the amount of sugar present in the substratum, result in the formation of citric acid. Both oxalic acid and citric acid may appear in the same cultures or they may each appear separately. Under the conditions studied much greater amounts of citric acid than of oxalic acid were formed.—The conditions resulting in the formation of citric acid in *Sterigmatocystis nigra* are the same conditions that favor its formation in *Citromyces*. Wehmer showed further that citric acid may also be formed by *Mucor pyriformis* and *Penicillium luteum*.—The author points out the danger of employing physiological characteristics in the classification of organisms in systems where morphological characteristics are also employed.—*V. H. Young.*

446. Neidig, R. E., C. W. Colver, H. P. Fishburn, and C. L. von Ende. **The acids of silage.** Idaho Agric. Exp. Sta. Bull. **104**: 19–20. 1918.

METABOLISM (NITROGEN RELATIONS)

447. Neller, J. R. **Studies on the correlation between the production of carbon dioxide and the accumulation of ammonia by soil organisms.** Soil Science 5: 225–241. *Pl. 1, fig. 1–5.* 1918.

METABOLISM (ENZYMES, FERMENTATION)

448. Bourquelot, Em., and M. Bridel. **Synthèses biochimiques simultanées du gentiobiose et des deux glucosides β du glycol par l'émulsine. [Simultaneous synthesis of gentiobiose and of two β-glucosides of glycol by emulsin.]** Compt. Rend. Acad. Sci. Paris 168: 253–256. 1919.—Emulsin of almonds is apparently a mixture of at least three enzymes; viz., gentiobiase, cellobiase and β-glucosidase. Theoretically such a mixture of enzymes acting on a mixture of β-glucose and glycol in diluted solution should bring about the synthesis of four substances; viz., cellibiose, gentiobiose and mono- and diglucoside of glycol. Experiments conducted along these lines yielded all of these substances in crystalline form except cellobiose.—*V. H. Young.*

449. Bourquelot, Em., and M. Bridel. **Synthèse biochimique, à l'aide de l'émulsine, du glucoside de l'alcool naphthylique alpha. [Biochemical synthesis of glucoside beta by emulsin.]** Compt. Rend. Acad. Sci. Paris **168**: 323–324. 1919.—Naphthyllic alcohol (α-naphthylcarbinol) obtained by Grignard's reaction was mixed with glucose in acetone solution and to the mixture emulsin was added. Changes in the rotatory power of the solution were noted.

At the end of 5 years, a glucoside (β-glucoside of α-naphthyllic alcohol) was isolated in crystals. This glucoside does not reduce copper solutions but, on hydrolysis with sulphuric acid or emulsin, copper solutions were reduced.—*V. H. Young.*

ORGANISM AS A WHOLE

450. Bracher, Rose. **Observations on Euglena deses.** Ann. Bot. 33: 93–108. *5 fig.* 1919.

451. Neidig, R. E., C. W. Colver, H. P. Fishburn, and C. L. von Ende. **Factors involved in the ripening of fruits.** Idaho Agric. Exp. Sta. Bull. 104: 22–25. 1918.

GROWTH, DEVELOPMENT, REPRODUCTION

452. Trowbridge, C. C., and Mable Weil. **The coefficient of expansion of living tree trunks.** Science 48: 348–350. 1918.

TEMPERATURE RELATIONS

453. Kidd, Franklin, and Cyril West. **The influence of temperature on the soaking of seeds.** New Phytol. 18: 35–39. 1919.—"The soaking of pea seeds (*Pisum sativum*) and of bean seeds (*Phaseolus vulgaris*) in excess of water is injurious at all temperatures, that is, the number and vigor of the plants produced are diminished. This injurious effect is more marked with low temperatures of soaking (5–10°C.) than with medium temperatures (15–20°C.). At higher temperatures the amount of injury resulting again increases, so that the curve of the number of plants produced from seeds soaked at different temperatures rises and falls about an optimum in the region of 15–20°C."—*Authors' summary.*

TOXIC AGENTS

454. Regan, W. S. **Progress of experiments for destroying Ribes with chemicals.** Rept. White Pine Blister Rust Control. Amer. Plant Pest Committee Bull. 2: 15–16. 1919.—See Bot. Absts. 3, Entry 416.

MISCELLANEOUS

455. Grove, Otto. **A ropy cider bacillus.** Ann. Rept. Agric. and Hort. Res. Sta. Univ. Bristol 1917: 15–17. [1918.]—Samples of cloudy cider held for 6 months became nearly milky with a ropy deposit. The deposit consisted principally of bacteria. The aroma and flavor were acetic; specific gravity 1.001; acid (determined as malic) 0.9 per cent; tannin 0.08 per cent; alcohol 4.02 per cent by weight.—A small rod shaped organism is said to cause the trouble. It is irregular in size, 1.5–2.5 —0.3–0.5μ, often in twos and in short chains, revolving motility in a few individuals, involutions forms not uncommon, spores not observed. Growth in various media is described. Malic, tartaric and citric acids added to 2 per cent glucose in "yeast water" practically suppressed growth in 0.4 per cent concentrations and entirely suppressed it in 0.8 per cent concentrations.—It is thought that if the mixture of apples used to make cider contains a sufficient proportion of sour apples to bring the initial acidity up to 0.5 per cent, or more, there is no danger of ropiness setting in.—*D. Reddick.*

456. Hills, T. L., and J. J. Putnam. **The influence of various woods on bacterial activity in the soil.** Idaho Agric. Exp. Sta. Bull. 104: 16–18. 1918.

457. Moreau, Fernand. **Sur le blanchiment des pates à papier colorées par des mycéliums de champignons.** [**Bleaching of paper paste colored by fungus mycelium.**] Bull. Trimest. Soc. Mycolog. France 34: 29–30. 1918.—The paper-school at Grenoble reported that the presence of a fungus belonging to the Sphaeriaceae within a paper paste caused a resistance to bleaching with hypochlorites. The author carried out a number of experiments to determine the resisting power of various fungi to bleaching with hypochlorites. In all cases he obtained discoloration of the colored spores or mycelium of the fungi under study; e.g., the black spores of *Rhizopus nigricans.* The presence of an excess quantity of black or brown fungi, however, would force the manufacturer to use such large quantities of discoloring material as to impair the fibers of the paste.—*Fred C. Werkenthin.*

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AGRONOMY

C. V. Piper, *Editor*

458. Anonymous. I. Results of wheat varieties and manurial trials.—Season 1918–19. Jour. Dept. Agric. Victoria 17: 158–163. 1919. II. [Same title.] *Ibid.* 17: 217–221, 1919.—See Bot. Absts. 3, Entry 844.

459. Baker, A. L. Those official potato grades. Potato Mag. 1[9]: 15, 25. *1 fig.* 1919.—Proposes certain changes.—*Donald Folsom.*

460. Bell, H. G. The fertilizer situation for 1919. Potato Mag. 1[8]: 5, 23, 28. 1919.—Discusses the situation in regard to potatoes.—*Donald Folsom.*

461. Berry, James B., and John K. Giles. The production of corn. Corn Club Guide. Part 1.—Increased yields as a result of disease control. Georgia State Coll. Agric. Bull. 165. *16 p., fig. 13.* 1919.

462. Bobilliard J. The flax industry. Jour. Dept. Agric. Victoria 17: 222–230. *Pl. 10.* 1919. Flax cultivation, varieties, seeding, manuring and soil preparation and milling are discussed.—*J. J. Skinner.*

463. Burlinson, W. L., and W. I. Brockson. Sweet clover production. Illinois Agric. Exp. Sta. Ext. Circ. 29. 7p. 1919.—The circular discusses the methods to be employed in sweet clover culture, either for hay or for seed.—*M. J. Prucha.*

464. Burlinson, W. L., and R. W. Stark. Spring wheat for Illinois. Illinois Agric. Exp. Sta. Bull. 214: 315–320. 1919.—Several varieties of spring wheat were tested for productivity under Illinois conditions.—*M. J. Prucha.*

465. Cross, W. E. Experiments on stripping cane. Louisiana Planter and Sugar Manufacturer 62: 301–302. *1 fig.* 1919.—Experiments at the Tucuman (Argentina) Experiment Station indicate that stripping off the lower leaves has no effect on hastening the maturity of sugar cane.—*C. W. Edgerton.*

466. Dash. J. Sydney, The sugar industry in the island of Guadeloupe, French West Indies. Louisiana Planter and Sugar Manufacturer 62: 124–126. *2 fig.* 1919.—Discusses briefly the problems of the sugar industry that are being investigated by the Experiment Station, including cultural methods, cane varieties, cane diseases, etc.—*C. W. Edgerton.*

467. Fisher, M. L. **The washed lands of Indiana: A preliminary study.** Indiana (Purdue) Agric. Exp. Sta. Circ. 90: 11–24. *Fig. 1–18.* 1919.—Much land in Indiana which was once productive has become practically worthless because of erosion. The worst conditions are found on the moderate slopes of 3 to 10 per cent. This erosion is due largely to the deforestation of steep hillsides, too heavy pasturing, a poor system of farming, and neglect. Methods of prevention of erosion and of reclamation of washed slopes are given.—*Max W. Gardner.*

468. Garber, R. J., and P. J. Olsen. **A study of the relation of some morphological characters to lodging in cereals.** Jour. Amer. Soc. Agron. 2: 173–187. *Fig. 1–2.* 1919.—Extreme varieties with regard to lodging and non-lodging in wheat, oats and barley were selected for this study. Measurements were also made on Minnesota No. 2 winter rye which stands up better than the other cereals. A study was made of the correlation between lodging behavior and average size of culm, average number of bundles, average area of sclerenchyma, thickness of culm wall, length of lignified cells and thickness of lignified cell wall. None of the above mentioned characters except thickness of cell wall seems closely related to lodging. Both early and medium oat varieties examined showed distinct correlations between thickness of lignified cell walls and lodging. In general, lodging in cereals is dependent on so many factors of unequal value in the different sorts that no one factor seems to be correlated closely enough with lodging to be of much value as a selection index. Among the different strains of oats and barley the average number of vascular bundles was found to be correlated with average diameter of culms.—*F. M. Schertz.*

469. Gordon, George S. **Tests with flax varieties.** Jour. Dept. Agric. Victoria 17; 164–170. *Pl. 4.* 1919.—Of 3 varieties of English flax, the Northern Linseed produced the largest yields. The percentage of oil in each was approximately the same. The American variety of fibre flax, "Blue Blossom," compared well in growth with the English varieties, and appeared disease resistant.—*J. J. Skinner.*

470. Gray, G. P. **Tests of chemical means for the control of weeds.** Univ. California Publ. (Agric. Sci.) 4: 67–97. *Fig. 1–11.* 1919.—A report of progress on experiments on the control of the wild morning glory [*Convolvulus arvensis*] involving trials of sodium arsenite, sodium cyanide, sulfuric acid, and acid sludge. The herbicides were either introduced into the soil, or sprayed upon the foliage.—The application of a spray of sodium arsenite to the foliage, while not wholly successful, gave some promising results. The spray was more toxic when the plants were approaching the dormant condition and when the moisture content of the air was sufficient to prevent rapid evaporation.—*H. S. Reed.*

471. Larsen, S. G. **Potato silage—how to make and use.** Potato Mag. 1^9: 14. 1919.

472. Le Clerc, J. A. **Potato flour and potato bread.** Potato Mag. 1^8: 9–10, 29–31, 33. *3 fig.* 1919.—Discusses preparation, composition, use and value of potatoes and potato products, with special reference to bread-making.—*Donald Folsom.*

473. Lewis, A. C., and C. A. McLendon. **Cotton variety tests, 1918.** Georgia State Bd. Entomol. Bull. 52. *40 p. Fig. 1.* 1919.—In South Georgia, all that part of the state south of a line from Augusta through Macon to Columbus, where wilt [*Neocosmospora vasinfecta*] occurs, only varieties of cotton (*Gossypium.*) resistant to it should be grown, such as Lewis 63, Council-Toole and DeSoto. Where wilt, does not occur in this section pure strains of Toole, Cleveland Big-Boll, Cook's Improved and College No. 1 are recommended. In North Georgia, Cleveland Big-Boll, Cook's Improved and College No. 1 are recommended —*T. H. McHatton.*

474. McClellan, W. R. **Growing potatoes in the Greeley district in 1918.** Potato Mag. 1^9: 9, 30–32. 1919.—Describes effects of 1918 weather and results from using selected seed stock.—*Donald Folsom.*

475. Mullett, H. A. Minyip crop and fallow competition. Jour. Dept. Agric. Victoria 17: 65–75. *Fig. 7.* 1919.—See Bot. Absts. 3, Entry 860.

476. Mullett, H. A. Garoke crop and fallow competition, 1918. Jour. Dept. Agric. Victoria 17: 193–206. *Fig. 7.* 1919.—See Bot. Absts. 3, Entry 862.

477. Olin, W. H. Blood will tell in potatoes. Potato Mag. 1^{6}: 7. *1 fig.* 1919.—Describes methods of a successful grower of seed stock.—*Donald Folsom.*

478. Prescott, S. C. Dehydration of vegetables—past, present and future. Potato Mag. 1^{9}: 6, 16–17, 20–23. *4 fig.* 1919.—Describes development of the dehydration industry, the methods employed, and discusses its importance.—*Donald Folsom.*

479. Purvis, J. E. Bracken as a source of potash. Proc. Cambridge Phil. Soc. 19: 261–262. 1919.—Confirms report that in the summer months the bracken (*Pteridium aquilinum* (L.) Kuhn) contains more potash than in later months. The bracken ferns grown on Welsh peaty soil yield more potash than those grown on Cambridge poor sandy soil.—*Michael Levine.*

480. Steinel, A. T. Story of the Skookum apple and its lesson for potato growers. Potato Mag. 1^{9}: 5, 33–34. *1 fig.* 1919.—Advocates better marketing methods.—*Donald Folsom.*

481. Stewart, F. C. Missing hills in potato fields: their effect upon the yield. New York Agric. Exp. Sta. [Geneva] Bull. 459: 45–69. *Fig. 1–2.* 1919.—An account of an experiment designed to show how much of the loss due to missing hills or "skips" in potato (*Solanum tuberosum*) fields is made up by the increased yield of adjoining plants. It was found that, in the case of a "skip" containing a single missing hill, the two adjoining plants (one on either side) together make up 46.4 per cent of the loss in total yield. From the data obtained, a formula is evolved for use in computing the comparative yields of plats having different percentages of missing hills; but it is pointed out that this formula applies only to a single set of conditions, *viz.*, such as obtained in the experiment.—Some data were obtained, also, on the difference in the yield of the two members of a pair of plants from halves of the same tuber when grown under conditions as nearly parallel as possible to field conditions. For 85 pairs of plants, the average difference, expressed in percentage of the mean yield of the pair, was 20.7 per cent.—*F. C. Stewart.*

482. Stuart, William. Commercial potato production in Florida. Potato Mag. 1^{8}: 6–8, 24–25. *Fig. 1–9.* 1919.—Discusses soil, location, varieties, importance of crop, irrigation and other cultural practices, and marketing.—*Donald Folsom.*

483. Tracy, S. M. Rhodes Grass [*Chloris gayana*]. U. S. Dept. Agric. Farmer's Bull. 1048. *14 p., 3 fig.* 1919.

484. Waldron, L. R., and J. A. Clark. Kota, a rust resisting variety of common spring wheat. Jour. Amer. Soc. Agron. 2: 187–195. *Fig. 1–3.* 1919.—A variety of bearded, hard, red spring wheat designated as Kota (U. S. Dept. Agric., C. I. No. 5878) has been shown to possess resistance to the form or forms of the stem rust of wheat present at Fargo, North Dakota, Brookings, South Dakota, and St. Paul, Minnesota, in 1918. Some evidence of such resistance had previously been secured in 1917. This resistance is decidedly greater than that possessed by the common spring wheats and second only to the more resistant durum wheats. Results secured at Fargo, North Dakota, in 1918 showed a capacity for yield decidedly above the average of the common wheats and only slightly less than the average yield of the durum wheats. Milling tests conducted with Kota wheat showed it to produce somewhat less flour than the average of other wheats used in the same test. Baking tests ranked it very high as a bread wheat, as it markedly exceeded the other common wheats except Marquis, which it equaled.—*F. M. Schertz.*

485. Westbrook, Edison C., and A. B. Hursey. **Tobacco culture. Bright leaf or flue-cured tobacco.** Georgia State Coll. Agric. Bull. 171. *20 p., 8 fig.* 1919.—General instructions for raising and curing tobacco, also plans for making curing houses.—*T. H. McHatton.*

486. Wiancko, A. T. **How to increase Indiana corn yields.** Indiana (Purdue) Agric. Exp. Sta. Circ. 91. *20 p., fig. 1–10.* 1919.—General advice is given to farmers relative to corn production in Indiana including choice of variety, improvement of seed by ear-to-row testing, selection and proper storage of seed ears, germination tests to eliminate unsatisfactory ears, rotational practice, soil fertilization, and cultural methods.—*Max W. Gardner.*

487. Wiancko, A. T., and C. O. Cromer. **Spring small grains in Indiana.** Indiana (Purdue) Agric. Exp. Sta. Bull. 225. *20 p., fig. 1–14.* 1919.—Comparative yield data secured between 1904 and 1918 at Purdue upon a number of varieties of oats, spring barley, and spring wheat and upon spring emmer and spring rye are presented. Comparison of these with the yields of winter wheat and rye leads to the conclusion that the climate of Indiana is in general too warm for the satisfactory development of spring-sown small grains. In the northern part of the state, oats and barley may be profitably grown. Oats is the principal spring grain grown in Indiana. General data relative to oat culture is given including methods of seed grain disinfection and the results of tests upon different rates of seeding.—*Max W. Gardner.*

488. Wiancko, A. T., S. D. Conner, and S. C. Jones. **The value of legumes on Indiana soils.** Indiana (Purdue) Agric. Exp. Sta. Bull. 226. *20 p., fig. 1–6.* 1919.—Out of 11,000,000 acres in field crops in Indiana, only 1,000,000 is in legumes. Twenty-five to 50 per cent of the nitrogen and humus of Indiana soils has been used up or lost, and 3,000,000 acres should be annually in legumes. Field tests in eight localities during 12 years show that crop rotations containing legumes resulted in an average increased yield of 4.6 bushels of corn and 4.7 bushels of wheat per acre as compared with rotations in which no legumes were included. Clover is the most practical legume for use in Indiana. General information relative to clover culture is given. Soy beans or cowpeas may be used on acid soils, alsike on wet soils, and hairy vetch or cowpeas on light sands.—*Max W. Gardner.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

489. Anonymous. **Endowment of scholarship and prizes.** Brooklyn Bot. Gard. Rec. 7: 88. July, 1918.—Cash prizes for school garden and nature study work at Brooklyn Botanic Garden are dealt with.—*C. S. Gager.*

490. Anonymous. **Prospectus of courses offered by the Brooklyn Botanic Garden, 1919.** Brooklyn Bot. Gard. Rec. 8: 1–13. Jan., 1919.

491. Cook, Melville Thurston. **Applied economic botany, based upon actual agricultural and gardening projects.** *i–xviii+261 p. 142 illustr.* J. B. Lippincott Company, Philadelphia and London, 1919.—A volume in the Farm Life Text Series, edited by K. C. Davis. Part I deals with plant life; Part II, with most important families of economic plants, with special exercises. The plan includes three things. First, a brief statement of recognized facts and principles concerning plants and plant growth usually given in text-books for secondary schools; second, a list of simple exercises and suggestions for observations, which the pupil can conduct without great difficulty and which will demonstrate many of the statements given in the book, and, third, a list of questions intended to be suggestive to the pupil, and to encourage further studies.—*C. S. Gager.*

492. Dille, Alvin. **Lessons on potatoes for elementary rural schools.** U. S. Dept. Agric. Bull. 784. *24 p.* 1919.—A detailed outline of twelve lessons on the potato [*Solnum tuberosum*] covering the following general topics: Selection of seed in the field; harvesting

and grading; marketing; winter storage; judging; structure of the potato plant and tuber; place of potato in crop-rotation; soil and fertilizer requirements; planting, including seed treatment; cultivation; potato pests; uses of the potato. A bibliography of publications relating to potatoes issued by the United States Department of Agriculture is appended.—*J. R. Schramm.*

493. Gager, C. Stuart. **Seventh annual report of the Brooklyn Botanic Garden, 1917.** Brooklyn Bot. Gard. Rec. 7: 33–82. Apr., 1918.

494. Gager, C. Stuart. **A brief history of the botanic garden idea in Brooklyn.** Brooklyn Bot. Gard. Rec. 7: 99–112. Oct., 1918.—Gives the history of the "Hunt Brooklyn Botanic Garden" (1855–1856) and of the botanic garden which it was proposed to establish in Prospect Park (Brooklyn) in 1861; also gives brief history of the land included in the present Brooklyn Botanic Garden and the steps leading to its establishment, referring to a fuller account of the present garden (Brooklyn Bot. Gard. Rec. 2: 109–114. Oct., 1913).—*C. S. Gager.*

495. Gager, C. Stuart. **Eighth annual report of the Brooklyn Botanic Garden, 1918.** Brooklyn Bot. Gard. Rec. 8: 25–93. Apr., 1919.—Includes reports of the director, the curator of plants, the curator of public instruction, and the librarian; also financial statements.—*C. S. Gager.*

496. G[ager]. C. S. **Science in peace and war.** Brooklyn Bot. Gard. Rec. 7: 89–92. July, 1918.

497. Guss, Roland W. **Gardening and nature study in the schools of Cincinnati.** Nat. Study Rev. 15: 85–87. 1919.—Children's garden products valued at three times cost of gardening budget.—*A. Gundersen.*

498. Guss, Roland W. **Transportation of city children to the suburbs for gardening.** Nat. Study Rev. 15: 87–88. 1919.—Cincinnati Board of Education pays carfare to children's gardens under certain regulations.—*A. Gundersen.*

499. Hopping, Aleita. **Mineral nutrition in plants—some suggestions on teaching the subject to high-school students of biology.** School Sci. Math. 19: 302–304. 1919.—Advocates use of three-salt solution, such as one containing calcium nitrate, magnesium sulphate and mono-potassium phosphate.—*A. Gundersen.*

500. Lee, Y. K. [Chinese.] **[Education in forestry.]** Khu-Shou [Science, a publication of the Science Society of China.] 4: 159–163. 1918.

501. Shaw, Ellen Eddy. **Fifth annual children's garden exhibit.** Brooklyn Bot. Gard. Rec. 7: 112–113. Oct., 1918.

502. Ullrich, Fred T. **Some reasons for the study of trees in nature-study in the elementary schools.** Nat. Study Rev. 15: 19–26. 1919.—Economic, aesthetic and religious reasons.—*A. Gundersen.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

503. Algau, H. **Calcul du préjudice résultant de l'abatage prémature des arbres forestiers. [Calculation of the damage resulting from the premature cutting of forest trees.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 7–15. 1919.—The damage to a forest resulting from its premature exploitation is measured by the difference between its expectation value and its present sale value for immediate utilization. The smaller the trees, the more rapid their growth; the greater the increase in value per unit of volume as the trees

increase in size, the greater is the damage. Detailed calculations are given showing that, in the case of two stands of fir or spruce, with different rates of growth, and with diameters ranging from 6 to 16 inches, the damage may vary from 200 per cent of the present sale value in case of the 6-inch trees to 5 per cent or less in the case of the 14-inch trees, 4 per cent being assumed as the rate of interest. No damage is done in the case of the 16-inch trees, which are ready for exploitation. So many variable factors, often impossible of exact determination, are involved, that any very accurate estimate of damage is practically out of the question.—*S. T. Dana.*

504. Anonymous. **Report of the Division of Forestry for the biennial period ended December 31, 1918.** *53 p.* Territory of Hawaii, Bd. of Agric. and Forest., 1919.—This report covers the activities of the Hawaiian Division of Forestry in 1917–18 and presents chiefly the progress made in placing the forest reserve system under administration and in the work of reforestation. On December 31, 1918 there were 47 forest reserves in the islands, with an area of 814,926 acres, of which 68 per cent is Government land. The protection of these areas is vital, as they directly govern the water supplies of lower lands, and fencing against stock and elimination of wild stock from fenced areas are the first necessities, since the forests deteriorate into grassland if not protected. Fires have been guarded against and only five occurred in the biennium.—Forest extension has been pushed; both by the experimental introduction of new species and by the larger-scale planting of species of known worth, largely koa. Jeffrey pine, Coulter pine, Jack pine, Scotch pine, Norway spruce, incense cedar and white pine have developed well at an elevation of 6,700 feet. A total of 1,632,598 trees of all species have been planted by private land owners and 776,045 by the Territory of Hawaii, in 1917–18.—*F. S. Baker.*

505. Anonymous. **Diseases in plantations of exotic trees.** New Zealand Jour. Agric. **18**: 63. 1919.

506. Anonymous. **Machine to locate forest fires.** Canadian Forestry Jour. **14**: 149. April, 1919.—A description is given of the Osborne fire finder, to be used at look-out stations, together with the manner in which the machine is to be used.—*E. N. Munns.*

507. Anonymous. **Nos forêts retrouvées: statistique sommaire des bois de l'État en Alsace et en Lorraine. (Statistical summary of the state forests in Alsace and Lorraine.)** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 5–7. 1919.—The state forests in Alsace and Lorraine cover 374,000 acres in five different departments and are composed largely of high forest.—*S. T. Dana.*

508. Anonymous. **Le Beau en matière forestière. [Beauty in forest matters.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 18–20. 1919.—Beauty as well as utility should be considered in restoring the forests devastated by the war. Simple coppice, coppice under standards, and even-aged high forest are all inferior in beauty to a selection forest, which resembles a cleared-up virgin forest. As Broilliard has said, "Are we not forced to the conclusion that the best treatment of forests is that which renders them the most beautiful?"—*S. T. Dana.*

509. Anonymous. [E. A.] **Buskfuru. Pinus montana uncinata, P. pumila and P. m. gallica.** Tidsskr. Skogbruk **26**: 375–376. *Pl. 1.* 1918.—Success has attended the planting in Norway of the above-named species, the seed of which has been received from France at frequent intervals during the last 50 years. These pines produce wood for fuel on exposed sites and poor soil where the native trees do not grow.—*J. A. Larsen.*

510. Anonymous. [J. W.] **Skogsentomolgiens stilling i Sverige. [Forest entomology in Sweden.]** Tidsskr. Skogbruk **26**: 376–378. 1918.

511. Anonymous [L.] **Kaninchenverbiss in Kiefernkultur. [Rabbit damage to pine plantations.]** Deutsch. Forstzeitg. 34: 50–51. 1919.—Need for food during the war led to considerable raising of tame rabbits as well as to a higher regard for wild ones. These do great damage to pine plantations. The common remedy, aside from exterminating the rabbits is to fence plantations with woven wire, which is expensive and impracticable for areas greater than 2 hectares. A better method for larger plantations is to use either plants grown with balls of earth, or twice transplanted stock, at least 1 meter high. Although expensive, this method is less so than fencing, and also insures more successful plantations.—*W. N. Sparhawk.*

512. Anonymous [P. F.] **Amélioration des chemins forestiers. [Improvement of forest roads.]** Rev. Eaux et Forêts 57: 69–74. *Fig. 1–3.* 1919.—Forest engineers have been too given to the use of straight lines in laying out forest roads, with the result that the latter can not always be used satisfactorily for the transportation of forest products. This difficulty should be avoided by using curves to carry roads around obstacles such as lakes, cliffs, and ravines. Methods are given in some detail for laying out reverse curves and for constructing directly the arc of a circle by means of an inscribed regular polygon.—*S. T. Dana.*

513. Arnould, A. **Dommages causés aux végétaux par les fumées industrielles. [Damages caused to plants by industrial fumes.]** [Rev. of: Holmes, J. A., E. C. Franklin, and R. A. Gould. **Report of the Selby Smelter Commission.** U. S. Dept. Int., Bur. Mines, Bull. 98. *528 p., 41 pl., 14 fig.* 1915.] Rev. Eaux et Forêts 57: 121–125. 1919.

514. Berry, James B. **Trees, theii use and abuse.** Georgia State Coll. Agric. Bull. 162. *19 p., 18 fig.* 1919.

515. Blair, Thomas Arthur. **Influence of snow cover on the temperature distribution in Utah, January, 1919.** Monthly Weather Rev. 47: 165–166. 1919.

516. Blum. **Windschaden in bayerischen Hochgebirge. [Wind-damage in Bavarian mountains.]** Deutsch. Forstzeitg. 34: 70. 1919.—Winds blew over some 500,000 cubic meters of timber, principally spruce, between January 3, and 7, 1919. Damage to the remaining forest by bark beetles is feared.—*W. N. Sparhawk.*

517. Bradley, J. W. **A useful wood-splitting machine.** Indian Forester 45: 18–21, Jan., 1919.—A machine employed during the coal shortage in India is described, with a diagram showing the plan of operation.—*E. N. Munns.*

518. Brown, W. R. **Experiments in scientific cutting.** Canadian Forestry Jour. 14: 169-172. April, 1919.—A descriptive account is given of different methods of cutting in the spruce and fir forests of New Hampshire and Maine, which were employed in the early nineties. Selective cuttings to a diameter of 14, 12 and 10 inches were tried, with clean cutting of conifers in strips and clean cutting proper in both mixed stands and pure conifers. It was found that, in the selective system, the 14-inch diameter limit appeared to be best, but the trees did not appear to recover after being released from suppression. This was also true of the cuttings in the other diameter classes, but the increased cost due to returning for the slight amount of material left on the ground, was prohibitive. Wind-fall was the worst enemy of the strip method, while removing the conifers from the mixed stands resulted in the dominance of the hardwoods. Clean cutting was not feasible because the reproduction of hardwoods more than offset the small amount of reproduction of conifers. The following conclusions are stated:—(1) The diameter limit in cutting should be based on the average age of the stand instead of on the average size of the trees. (2) Pure coniferous stands should be clean cut, leaving seed-trees for reproduction. (3) In even-aged, mixed stands, with deep soil and in locations protected from wind, thinning can be made by selective cutting when the hardwoods are removed. In poor stands the strip or group system can be applied under the same conditions. (4) Balsam-fir should be clean cut and the hardwoods destroyed wherever possible, if they cannot be marketed. (5) All methods of selective cutting should be applied with the expectation that there will be more or less loss from wind.—*E. N. Munns.*

519. Brush, W. D. **Utilization of elm [Ulmus].** U. S. Dept. Agric. Bull. 683. *43 p., 4 pl., 8 fig.* July 29, 1918.—Although limited in the amount of its stand, elm is an important wood for bent work and for uses in which it is subject to shock or impact and rough use in general. There are five species which produce the supply of elm wood in the United States: White elm (*Ulmus americana*), slippery elm (*U. fulva*), cork elm (*U. racemosa*), wing elm (*U. alata*), and cedar elm (*U. crassifolia*). The mechanical properties, the wood structure, location of supplies, and sizes attained are discussed for the different species. Cork or rock elm is considerably stronger than the other species. It is estimated that about 75 per cent of the total stand of elm, which is estimated at 7,500,000,000 feet, is white elm, half of which is located in Michigan, Wisconsin, and Minnesota. The present lumber cut of elm, 240,000,000 board feet, places it twentieth in rank among all woods and tenth among hardwoods in point of lumber production. The lumber cut has decreased considerably in the last 10 years as shown by tables. Practically all the elm cut, except that cut for fuel, goes to factories to be used in the manufacture of various products. The leading industries consuming it, in order of amount used, are slack cooperage (39.6 per cent) boxes, baskets and crates (18.1 per cent), vehicles and vehicle parts (8.7 per cent), chairs and chair stock, woodenware and dairymen's and poulterers' supplies, musical instruments, refrigerators and kitchen cabinets, furniture, agricultural instruments and trunks and valises. Grading rules, lumber prices, the value of standing timber, and marketing of elm timber are all discussed and a classified list of uses of elm in different wood-using industries is given.—*W. D. Sterrett.*

520. Bryant, R. C. **The war and the lumber industry.** Jour. Forestry 17: 125–134. 1919. —The war developed the fact that the lumber industry of the United States was not sufficiently elastic or resourceful to meet the demands made upon it, necessitating aid of all kinds. The lack of public spirit on the part of the lumbermen and their narrow point of view were remarkable and were overcome temporarily through the office of a lumber director. As a whole, lumbermen do not grasp their relationship to the public and forestry has apparently not gained recognition on private lands. A more complete study of lumber economics is urged. —*E. N. Munns.*

521. Butterwick, A. J. S. **The use of Atlas preservative to kill trees.** Indian Forester 45: 22–25. Jan., 1919.—Twenty tests were carried out on the use of the preservative upon various Indian woods, using only trees with very little or no heartwood, as these are the most difficult to kill by girdling. The trees were deeply girdled and the antiseptic was painted over the exposed wood. No results were noted; the treatment was applied in July and the trees retained their normal green foliage and sprouted. Trees were also treated with the preservative by injection, holes being bored several inches deep, into which the poison liquid was introduced. The results were variable and led to the conclusion that these methods were not advisable in practice.—*E. N. Munns.*

522. Cabrera, Teodoro. **Tortas para hacer carbon. [Fuel bricks.]** Revist. Agric. Com. y Trab. 2: 173. 1919.—It was found that the fruit of the tree, *Enterolobium cyclocarpum* Griseb., which grows very commonly along the roads, makes an excellent adhesive to form bricks or bits of carbon.—*F. M. Blodgett.*

523. Carpenter, Ford A. **Convectional clouds induced by forest fires.** Monthly Weather Rev. 47: 143–144. *1 pl.* 1919.—Forest fires in southern California are frequently responsible for the formation of clouds, but none of these are known to have produced rain.—*E. N. Munns.*

524. Chase, Agnes. **Some causes of confusion in plant names.** Jour. Forestry 17: 159–162. 1919.—See Bot. Absts. 3, Entry 1808.

525. Clark, F. G. **Appraisal of fire damage to immature timber for statistical purposes.** Jour. Forestry 17: 36–38. 1919.—A formula is proposed for use in general studies of fire-damage over large areas. The general formula for replacement is modified (1) by reducing the cost of planting by a percentage represented by the proportion of artificial to natural reproduc-

tion based on experience, (2) by pro-rating the values for each age class for the different species, in accordance with present relative commercial values. An example is presented for northern Idaho and Montana.—*E. N. Munns.*

526. Clifford, J. D. **Effect of thinning on a young teak plantation.** Indian Forester 45: 16–18. 1919.—An acre of 17-year-old teak, 30 feet in height, was thinned in 1913 and remeasured and compared with the check plot in 1918. The 5-year girth increment per tree amounted to 3.49 inches on the thinned area and 2.73 on the unthinned, the mean annual increment being 0.70 and 0.55 inches respectively. On the thinned plot eleven more trees attained a girth of two feet in five years than was the case on the unthinned, while the excess girth amounted to 272 inches. This first thinning took 40 per cent of the stems, while the second, in 1918, took 10 per cent of those remaining. Remeasurement is planned for 1923.—*E. N. Munns.*

527. Cremata, Merlino. **Cercas alambradas y setos en Cuba. [Fences and hedges in Cuba.]** Revist. Agric. Com. y Trab. 2: 259–272. *29 fig.* 1919.—Chapter one of this article gives a list of some sixty kinds of wood that make good posts. It includes a brief description of the tree and the wood, notes on distribution, history, nomenclature, etc. Chapter two deals in the same way with trees that may be planted as living posts.—*F. M. Blodgett.*

528. Crevat, Jules. **Production d'une plantation de pins noirs d'Autriche. [Yields from a plantation of Austrian pine.]** Compt. Rend. Acad. Agric. France 1919: 32. 1919.—Brief note on the methods of establishing a plantation of Austrian pine and the yields to be expected from it.—*E. A. Bessey.*

529. d'Aboville, P. **Détermination du diamètre au milieu du tronc de l'arbre sur pied. [Determination of the diameter at the middle of the trunk of a standing tree.]** Rev. Eaux et Forêts 57: 117–120. *2 fig.* 1919.—If d is the diameter of a tree at the height of the observers eye, d' the diameter at half the height of the tree, and f the coefficient of form, then $d' = df$. If the observer stands at a distance from the tree equal to half its height less the height of the eye above the ground, then $f = 1.4\frac{n'}{n}$, when n' and n represent, respectively, the apparent magnitudes of d' and d on a graduated scale held horizontally at arm's length. Having obtained f, the diameter at the middle-height of the tree, d', can readily be determined from the first formula given. Repeated tests have shown that satisfactory results may be secured by this method.—*S. T. Dana.*

530. Dana, S. T. **Floods and erosion.** Canadian Forestry Jour. 14: 159. April, 1919.—Examples are given of floods and erosion on watersheds where the timber cover has been denuded by destructive lumbering. Another example shows that since forest cover has become established floods and erosion have practically ceased.—*E. N. Munns.*

531. Eulefield. **Kiefern-Harznutzung. [Production of resin from Scotch pine.]** Deutsch. Forstzeitg. 34: 22. 1919.—An experimental operation on 10.86 hectares at Eisenbach in Oberhesse, employing Scotch pine (*Pinus sylvestris*) 86 to 110 years old, yielded 1.37 kgm. of fluid per tree (299 trees per hectare). Gross returns, at 3 marks per kilogram, were 4.12 marks per tree, and expenses were 0.98 marks per kilogram or 1.35 marks per tree. Net return per hectare was 828.80 marks. On a level site the southwest side of the trees yielded the most resin; on a southeast slope, the east side yielded most. The yield was less on hot days and greater on warm, damp days.—*W. N. Sparhawk.*

532. Fernow, B. E. [Rev. of: Gill, W. **Annual progress report upon state forest administration in South Australia, 1917–18.** Woods and Forests Dept. *13 p.* 1918.] Jour. Forestry 17: 324–325. 1919.

533. Fischer, C. **Das Verhalten der Sitkafichte in der Oberförsterei Rüdesheim, Bezirk Weissenthurm. [Behavior of Sitka spruce.]** Deutsch. Forstzeitg. 34: 69. 1919.—Sitka pruces (*Picea sitchensis*) planted in 1901 are now from 12 to 14 meters high, and others planted

in 1906 are from 7 to 8 meters high. Douglas fir has done nearly as well, and other American conifers have also given good results. Spruce has stood severe frosts without injury.—*W. N. Sparhawk.*

534. Fisher, M. L. **The washed lands of Indiana: A preliminary study.** Indiana (Purdue) Agric. Exp. Sta. Circ. 90. *24 p., 18 fig.* 1919 —See Bot. Absts. 3, Entry 467.

535. Flury, Phillipp. **Ueber Wurzelverwachsungen. [Natural root grafting.]** Schweiz. Zeitschr. Forstw. **70**: 37–41. 1919.—Natural grafting of roots one or more centimeters in diameter was found to be as common as the natural grafting of stems and branches, but no grafting of smaller roots was found. In experiments, roots of spruce, pine, fir, beech, oak and ash have been held in contact under pressure since 1912, but no grafting has occurred.—The grafting of larger roots is explained by the fact that in these roots the cambium grows as in branches and stems and consequently permits of union of growing cells by division from the inside layer, while in the young root the growing cells divide in the outer layer and consequently cannot form a union. It is also pointed out that the grafting of absorption roots would be a disadvantage to the plant while the grafting of older roots would only tend to strengthen the system of support roots. Author remarks that nature has possibly provided the young roots with a repulsive power to react away from one another, as a stem is autotropic while a root is geotropic.—*J. V. Hofmann.*

536. Foster, J. H. [Rev. of Rankin, W. Howard. **Manual of tree diseases.** *398 p.* MacMillan Co., New York, 1918.] Jour. Forestry **17**: 321. 1919.

537. Guyot, Ch. **Un projet de loi "tendant a la réorganisation générale de la police. [A proposed law for the general reorganization of the police.]** Rev. Eaux et Forets **57**: 100–103. 1919.—The Minister of the Interior has asked all the municipal councils in France for suggestions on a proposed law which he plans to present to Parliament, transferring to the authority of the prefect the greater part of the police powers now exercised by the municipal authority in accordance with the law of April 3, 1884, and organizing a rural police to replace the present rural guards. The proposed law is of interest to foresters and forest owners because it would afford better protection to private forests than the present system.—*S. T. Dana.*

538. Glover, H. M. **Conversion of blue-pine forest to deodar in the Bashahr Division of the Punjab.** Indian Forester **45**: 1–3. *Pl. 1–3.* 1919.—The rapid growth of deodar (*Cedrus deodara*) following the removal of blue pine (*Pinus excelsa*) is described.—*E. N. Munns.*

539. Grainger, M. A. **British Columbia reduces fire hazards.** Canadian Forestry Jour. **14**: 152. April, 1919.—An abstract is given of the new fire law for British Columbia, together with a brief description of activities in that province.—*E. N. Munns.*

540. Hagem, Oscar. **Fremmede träslag i vort lands skogbruk. [Exotic trees in our forests.]** Tidskr. Skogbruk **26**: 363–375. *Fig. 1–4.* 1918. Calls attention to the need of more extensive experiments with exotic conifers, particularly those from the northwestern United States, Canada and the coast of Alaska. In these regions both temperature and precipitation appear to be similar to those pevailing on the west coast of Norway. Extensive experiments were begun by Börre Giersten in 1900–1903 with different exotics, but lack of knowledge of their requirements and the difficulty of obtaining different planting sites have frustrated most of the earlier efforts. The problem can only be approached, with any assurance of success, by sending some one abroad to collect seed and to study the climatic conditions and the distribution of the species intended for trial.—*J. A. Larsen.*

541. Hagem, Oscar. **Beretning fra vestlandets forstlige forsögsstation. [Report of the Western Forest Experiment Station.]** Tidsskr. Skogbruk **26**: 392–395. 1918.—Anton Smitt was sent to the United States and Canada to collect tree seed for trial in Norway. Forty pack-

ages have been received. Many samples were sown in spring of 1917, with uniformly good germination. Those from the northwest coast of U. S. A. have shown considerable frost injury while those from northern British Columbia and from Alaska survived the first winter quite well.—The Bergen Experiment Station is conducting an extensive series of soil tests for the purpose of discovering the causes of failure of plantations on soil with heavy raw humus and on "lyng" ground. The 1918 station budget is given.—*J. A. Larsen.*

542. Haslund, Ove. **Taksation i firmaet Haaken Mathiesen's Skoge. [Forest taxation on the holdings of Haaken Mathiesen.]** Tidsskr. Skogbruk **26**: 380–385. 1918.

543. Haughton, S. **Umbrella and baobab trees.** Ceylon Antiquary and Lit. Reg. **4**: 171. 1919. Brief, non-technical note on the baobab (*Adansonia digitata*) south of Mannar Island, which, according to local tradition, was transplanted there by Arabs from the Red Sea, probably attracted by the pearl fishery. No reference is made to Watt's Dictionary (**1**: 105), who attributes the introduction of the tree into India to Arab traders.—*B. Laufer.*

544. Hawes, A. F. **Economic aspects of the wood-fuel campaign.** Jour. Forestry **17**: 163–167. 1919.—The coal shortage and the winter of 1917–18 aroused much interest in the use of wood for fuel in U. S. A. A campaign to encourage this use was inaugurated and permanent results are looked for in the establishment of municipal forests, the creation of wood-markets on a coöperative basis, the establishment of standards of measurement and classification for fuel wood, an increased use of fuel wood and a greater general interest in woodland as a source of fuel.—*E. N. Munns.*

545. Hees. **Bombenwürfe in Kiefernbestande. [Effect of bombs on pine stands.]** Deutsch. Forstzeitg. **34**: 35. 1919.—Describes damage done by airplane bombs in pine forests near Trêves Trier).—*W. N. Sparhawk.*

546. Hole, R. S. **Notes from Dehra Dun Herbarium, No. IV. Cassia auriculata.** Indian Forester **45**: 64–65. 1919.—A silvical distribution of a shrubby tree, the bark of great value for tanning.—*E. N. Munns.*

547. Howe, C. D. **A land of forests—without forestry.** Canadian Forestry Jour. **14**: 212–216. 1919.—Only 500,000 square miles of Canada is actually forest-producing, and half of this has been burned. Investigations show that the white pine stands are practically gone and that the tree is not being reproduced except on limited areas. In the spruce areas there is a reduction of two-thirds in the future growing stock, while in balsam stands the reduction is more than one-sixth. Patronage and the lack of proper management are responsible for these conditions, which can be remedied by recuperative forestry practices.—*E. N. Munns.*

548. Howe, C. D. **Making of the spruce tree.** Canadian Forestry Jour. **14**: 186. April, 1919.—White spruce has seed crops at intervals of from three to seven years, a fact ascribed to the use of large quantities of stored food, and to water conditions during the period between seasons. In many cases heavy yields extend uniformly over large areas.—*E. N. Munns.*

549. Hubault, E. **Une essence à grand rendement. [A species with large yield.]** Rev. Eaux et Forêts **67**: 75–79. 1919.—Douglas fir (*Pseudotsuga douglasii* Carr.), because of the properties of its wood, its rapid growth, and its large yield, is a North American species of special interest for use in France. First introduced into Scotland during the first half of the last century it has proved successful there, in southwestern England, in Germany, and in France. Artificial stands do best on soils that are light, deep, and fertile, and poorly on either heavy clays or dry sands. The species is generally regarded by English foresters as preferring siliceous soils, although its aversion to calcareous soils has not been demonstrated. The "Pacific green" variety has done well in Scotland and northern England with an annual precipitation of from 25 to 33 inches, while the "Colorado blue" variety does well in drier climates. The former, which, because of its more rapid growth, is the preferred variety, needs

protection from violent winds and from early and late frosts, and is, therefore, often planted under a light cover. Plantations of this variety in the British Isles up to 60 years of age show a larger annual yield than plantations of larch, Sitka spruce, Norway spruce, or Scotch pine. In France this variety appears particularly adapted to the western part of the country, and can also be used in the Vosges region, but there on account of the danger from late frosts should be planted under a light cover. Judiciously employed, Douglas fir will furnish a larger yield than any other species that can be used in reforestation.—*S. T. Dana.*

550. Jobez, H. **La forêt et le pâturage boisé a la Société Vaudoise des Forestiers. [Forest and pasture as discussed by the Vaud Society of Foresters.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfot **13**: 15–18. 1919.—Increased pasturage is essential for the quick reconstitution of cattle herds exhausted by the war. At the same time the forests ought not to suffer, hence the necessity for pasture-forests. These increase the revenue from the soil, create a cattle shelter and favor the desirable kinds of forage.—*S. T. Dana.*

551. Jolyet, A. **Deux essences qu'il ne faudra pas oublier. [Two species that should not be forgotten.]** Rev. Eaux et Forets **57**: 93–99. 1919.—In restoring the forests in the area devastated by the war, species should be chosen which are of rapid growth and capable of furnishing usable products in a short period. On the other hand, in restoring portions of the forest in the midst of otherwise undamaged stands, the work should be conducted with a view to obtaining new stands as nearly as possible of the same type as those already existing. This means high forests of conifers in the Vosges mountains and coppice under standards in the greater part of the forests in the plains. In the Vosges plantations of the "green" form of Douglas fir are indicated. In the plains, black locust and white alder (*Alnus incana*) should be given careful consideration because of their rapid growth, ability to reproduce by suckers, and immunity from insect damage. White alder, while less known than black locust and producing a less valuable wood, is more tolerant, thrives in dry, calcareous soils, and suckers very abundantly. These, however, are not the two species referred to in the title of the article. From an economic point of view, it is essential to replace as quickly as possible the high forest trees which have disappeared, whether the coppice will recover naturally or must be replaced artificially. White (Weymouth) pine (*Pinus strobus*) and white poplar (*Populus alba*) are the two species particularly recommended for this purpose. White pine has a great advantage in being intermediate both in tolerance and in density of crown. It will come in naturally in the midst of broadleaf stands, and will also permit the establishment under its shade of such hardwoods as hornbeam, maple, ash, and even the common oak. It is well accommodated to the French climate, and will thrive on many soils. It is particularly suited for the formation of a high forest of conifers over a coppice of hardwoods, which is the only form of stand in which its use is recommended. This is because the tree must be allowed to reach fairly large size in order to form any considerable portion of heartwood, the sapwood being regarded practically as waste, during which time a return is yielded by the hardwood coppice; and because the white pine is nearly everywhere attacked by a fungus with a subterranean mycelium, the spread of which is prevented when the trees are grown far enough apart so that their roots do not come into contact with each other. White poplar has been looked upon somewhat askance because the abundant suckers which it produces have sometimes proved a nuisance in adjacent agricultural lands. These suckers would do no harm in the forests, where its use is recommended because of its rapid growth, coupled with the production of a merchantable wood which is among the best of the poplars. It is especially suited for use in naturally deep, fertile soils such as those formerly used for agriculture, but which have been so cut up by trenches and by shell holes as to be useless for cultivation for many years. The Japanese larch (*Larix leptolepis*) might also prove a desirable species to use along with white pine and white poplar, but not sufficient is known regarding its behavior in France to warrant too hearty endorsement.—*S. T. Dana.*

552. Judd, C. S. **Forestry as applied in Hawaii.** Hawaiian Forest. and Agric. **15**: 117–133. May, 1918. This paper, originally delivered as an address, is divided into two parts; the first is a popular discussion of forestry in general and the second covers Hawaiian forestry

problems. Once heavily forested except on the lee slopes, these islands now have only 20 per cent of their area in forest. There are four general types of forest, the Algaroba (*Prosopis juliflora*) type, the Kukui (*Alcurites mollucana*) type, the Ohia lehua (*Metrosideros collina polymorpha*) type and the Mamani (*Sophora chrysophylla*) type. The Ohia lehua type serves merely as protection forest for agriculture and the next preceding and following types have large protective value, although they may be worked for their timber in a minor way. The Algaroba type alone is primarily timber-producing. Protection is a prime requisite because the irrigated sugar industry in the lowlands depends upon these rain forests. Cutting, but more particularly grazing, has caused the deterioration of the forests and their replacement by hilo grass. Methods of ridding the forests of this grass are discussed, and warning is sounded against wholesale importation of exotics which may prove worthless pests in Hawaii.—*F. S. Baker.*

553. Korstian, C. F. **Life forms, leaf size and statistical methods in phytogeography.** [Rev. of: Smith, Wm. G. **Raunkiaer's life forms and statistical methods.** Jour. Ecol. 1: 16–26. 1913.] Jour. Forestry 17: 328–331. 1919.

554. Korstian, C. F. **Root habits of trees in northern Canada.** [Rev. of: Pulling, Howard E. **Root habit and plant distribution in the far north.** Plant World 21: 223–233. 1918.] Jour. Forestry 17: 327–328. 1919.

555. Lee, Y. K. [Chinese] **[Education in forestry.]** Khu-Shou [Science, a publication of the Science Society of China] 4: 159–163. 1918.

556. Levy, E. Bruce. **Seed-testing.** New Zealand Jour. Agric. 18: 129. 1919.—The writer states that seed-testing has been established by the New Zealand Department of Agriculture for 10 years, although not yet compulsory. Two methods in common use, the continental method and the Irish method, are briefly compared. The Irish method is the one adopted in New Zealand and also in Great Britain. Theoretically the continental method is said to be more nearly correct but it is so laborious as not to be practical. A description of the New Zealand system follows in great detail, under the heads of: Process of germination, Purity analysis, Recording of progressive germination, Reporting and accounts.—*E. R. Hodson.*

557. Mahood, S. A. **The collection and some uses of the oleoresin of Douglas fir. (Oregon fir balsam, Douglas fir turpentine).** Amer. Jour. Pharm. 91: 345–349. *Pl. 1.* 1919.—The collection of the oleoresin of Douglas fir (*Pseudotsuga taxifolia*) is accomplished in one of two ways. By the first, or "draining," method the oleoresin is allowed to drain into suitable receptacles when the trees are felled. By the second, or "cruiser," method apertures are made in the "pockets" produced by wind shakes, when the oleoresin readily flows out.—A description of the methods employed for the collection of oleoresin from the European larch follows, which might presumably be applied to advantage in securing Douglas fir turpentine. By the European method, holes (about 1 to $1\frac{1}{2}$ inches in diameter and a foot from the ground) are bored to the centre of the tree, in the spring. They are then plugged and in the autumn are opened and allowed to drain, or they may be left open from the first and allowed to drain into suitable receptacles. The author suggests the combination of the European method with the "cruiser" method. The remaining portion of the paper deals with the commercial uses of the various oleoresins.—*Anton Hogstad, Jr.*

558. Melrose, G. P. **Red-belt injury in British Columbia.** Canadian Forestry Jour. 14: 164. April, 1919.—A Red-belt injury in Douglas fir is reported for the spring of 1916. This appears to have been caused by a sudden change in temperature during the time when the trees were unable to secure water from the frozen ground, or while portions of the trunk were frozen. No insect action yet noted in this connection.—*E. N. Munns.*

559. Mitchell, J. A. **Bear clover.** Jour. Forestry **17**: 39–43. 1919.—A study of bear-clover (*Chamoebatia foliolosa*) on the Eldorado and Stanislaus forests [western U. S. A.] in 1912 indicates that forest reproduction is adversely affected by a bear-clover ground cover and that the relative percentage of incense-cedar reproduction increases, while that of pine reproduction diminishes, as the density of bear-clover increases. In extremely heavy stands all reproduction is excluded.—*E. N. Munns.*

560. Munns, Edw. N. **Some biological and economic aspects of chaparral.** Jour. Forestry 17: 9–14. 1919.—The relationship between chaparral and tree-growth in the transition belt in western U. S. A. is pointed out, with consideration of the bearing of the brush on the problem of forestation. By coppicing, chaparral forms a soil cover quickly after fire and it is valuable as a soil binder, preventing erosion and landslides. The economic value of chaparral is briefly discussed.—*E. N. Munns.*

561. Munns, Edw. N. **Women in southern lumbering operations.** Jour. Forestry **17**: 144–149. 1919.—Owing to the shortage of labor in the South [U. S. A.] during the latter part of 1918, women undertook much work formerly done by men. Few positions in the woods, mill, or office were not occupied by women, who generally proved satisfactory.—*E. N. Munns.*

562. Myhrwold, Prof. **Skogkultur i Frankrike. [French silviculture.]** Tidskr. Skogbruk **27**: 8–15. *Pl. 1–7.* 1919.

563. Nansen, Fritjof [and others]. **Frankrike-Norge-Skogen. [France-Norway forests.]** Tidskr. Skogbruk **27**: 1–8. 1919.—Original correspondence between the two governments relating to proposed plantations of Norway spruce in France by Norwegian foresters.—*J. A. Larsen.*

564. Pearson, G. A. [Rev. of: Hesselman, Henrik. **Soil nitrification in relation to forest reproduction.** Skogsvordsforeningens Tidskr. (Häft 1) *104 p.* 1918.] Jour. Forestry **17**: 69–73. 1919.—Investigations of the absence of forest reproduction on the heath lands of northern Sweden showed that the chemical condition of the floor was of more importance than was soil moisture deficiency. Most of these forest soils are characterized by the fact that transformation of organic matter toward nitrates stops with the formation of ammonia. This is remedied by clear cutting or heavy thinning or by cultivation or burning. The result is due to the activity of bacteria which require salts for development. The condition of the soil may be determined by the vegetation cover, certain plants indicating nitrogen deficiency.—In America, the application of these findings is limited to the humid regions, and it is significant that heavy cutting and burning are practiced in the douglas fir region. In open yellow pine stands the soil has a deficiency of litter and humus, except under old trees, and reproduction occurring under such circumstances is due more to better moisture conditions than to improved chemical conditions of the soil. Lack of reproduction in these yellow pine forests is due to poor soil moisture conditions at a critical period in the life-history of the tree.—*E. N. Munns.*

565. Recknagel, A. B. **Timber census in the northeastern states [U. S. A.].** Jour. Forestry **17**: 178–179. 1919.—A timber census was made of the northeastern states during 1918. The stand of spruce in New York is given as 3,500,000,000 feet. Other data are not yet compiled —*E. N. Munns.*

566. Record, S. J. **Mahogany and some of its substitutes.** Jour. Forestry **17**: 1–8. 1919.—A key is given embracing the woods known in the trade as "mahogany," or used as substitutes for the wood to which this name belongs. Representatives of 13 families and 27 genera are described, 11 genera belonging to the mahogany family, Meliaceae. The key is based on gross and lens characters. [See Bot. Absts. 2, Entry 748.]—*E. N. Munns.*

567. Reed, George M. Phytopathological survey of the trees and shrubs of Prospect Park and the Botanic Garden (Brooklyn). II. Report of the second season's work. Brooklyn Bot. Gard. Rec. 7: 14–23. 1916.—Sect. Bo Absts. 3, Entry 785.

568. Richardson, H. W. The northeastern Minnesota forest fires of October 12, 1918. Geog. Rev. 7: 220–232. *Figs. 1–5.* April [May], 1919.

569. Rowlee, W. W. Synopsis of the genus Ochroma, with descriptions of new species. Jour. Washington [D. C.] Acad. Sci. 9: 157–197. 1919.—See Bot. Absts. 3, Entry 1835.

570. Schwab, W. G. The forests of Dickenson County, Virginia. Office of the State Forester, Bull. 17. *16 p., 6 pl., 1 folded map.* 1917.

571. Schwab, W. G. The forests of Buchanan County, Virginia. Office of the State Forester, Bull. 16. *20 p., pl. 2–8, 1 folded map.* 1918. [Reprinted from Virginia Geol. Surv. Bull. 18.]

572. Spörri, Ed. Zur Gründung von Staatswaldbesitz im Kanton Zug. [Reason for state forests in the Canton Zug.] Schweiz. Zeitschr. Forstw. 70: 41–43. 1919—While state control of all industries tends to eliminate individual initiative, the control of industries which are vital to the state is necessary. The forest industry falls in the latter class, and the experience of other cantons led to purchase of forests in Zug in 1915 and 1916, and additions later. To date 92 hectares have been purchased, of which about 40 per cent is timbered land. The state control of forest will build up a state industry for the community where private control would not.—All European states own forests, and government control is receiving more and more attention in the United States on account of the destruction of the forests by private owners. —*J. V. Hofmann.*

573. Stecher. Bucheckernernte 1918. [Beechnut harvest of 1918.] Deutsch. Forstzeitg. 34: 32–33. 1919.—Describes gathering of beechnuts in Cassel-Reinhardtswald. One village of 800 people gathered more than 400 centner (44,000 pounds). The nuts are used for food, being especially valuable under conditions existing at the time on account of their high oil content. Prices were as high as 150 marks per centner ($0.32 per pound). One hectaliter of fresh, dry nuts weighs 1 centner; after 10 days in a warm room there is a loss of weight of 11 kgm. and when completely dry a further loss of 2.5 kgm. With crude hand presses the nuts yield 14 per cent of their weight as oil.—*W. N. Sparhawk.*

574. Sudworth, Geo. B. [Rev. of: Pearson, R. S. Note on the preparation of turpentine, rosin, and gum from Boswellia serrata. Indian Forest Rec. 6: 303–345. 1918.] Jour. Forestry 17: 322–325. 1919.

575. Taylor, N. Effects of the severe winter (1917–18) on the woody plants of the Garden. Brooklyn Bot. Gard. Rec. 7: 83–87. 1918.

576. Taylor, W. M. The ailanthus-tree [Ailanthus glandulosa] for woodpulp. New Zealand Jour. Agric. 18: 223. April 21, 1919.—Comment is made on an article by V. Fedele (Monthly Bull. Agric. Intell. and Plant Dis. [Roma]). This tree, commonly known as "tree of heaven," has many qualities which fit it for pulp production. It is readily propagated by root cuttings and transplants well at any age. The growth is rapid, and it has the remarkable habit of making its strongest growth after pollarding. It is said that an acre of trees will yield approximately 25 tons of wood every third year. It thrives very well on every site in New Zealand, even on arid or very rocky soils. The wood yields 44 per cent of easily bleached cellulose, from which paper pulp can be made. Altogether it is considered a tree of great promise for the New Zealand paper industry.—*E. R. Hodson.*

577. Taylor, W. H. Shelter belts. New Zealand Jour. Agric. 18: 165. 1919.—This article deals with protective planting for orchards and states that quickness of growth is the chief consideration while the kind of trees obtainable is a secondary consideration. The

pines most used are, *Pinus radiata* (*insignis*) and *P. muricata*, of which the latter is the most valuable, as it retains its lower branches longer. Black wattle (*Acacia decurrens*) is recommended for certain localities. Where a high shelter is required with narrow limits, Lombardy poplar is regarded most suitable, especially when in combination with *Elaeagnus japonica*. North American species recommended are Gowen cypress (*Cupressus goveniana*), redwood (*Sequoia sempervirens*), Monterey cypress (*Cupressus macrocarpa*), and Lawson's cypress (*Chamaecyparis lawsoniana*), particularly the latter on account of its hardiness, wind resistance, low branching habit and rapid growth. A number of other species are described, and methods of treatment and spacing.—*E. R. Hodson.*

578. Toumey, J. W. **The relation of gray birch to the regeneration of white pine.** Jour. Forestry **17**: 15–20. 1919.—Studies on plots of birch and pine in New Hampshire show that pure stands of birch (*Betula populifolia*) do not cause the death of white pine (*Pinus strobus*), though the rate of height growth of the white pine falls off rapidly with the increase in density of the birch stand. In general, the rate of height growth of the pine varies directly with the density of the stand of the birch, due more to root competition than to light relationships. Stands of birch can be planted without cutting of the pine until the birch can be utilized, or until the growth of the pine is measurably decreased.—*E. N. Munns.*

579. Toumey, J. W. [Rev. of: Sampson, A. W. **Effect of grazing upon aspen reproduction.** U. S. Dept. Agric. Bull. 741. *29 p.* 1919.] Jour. Forestry **17**: 564–567. 1919.—The duty of the forester is to care for forest reproduction and to grow successful crops of timber on forest land. Uncontrolled and unregulated grazing on such land has no place, but some grazing may be permitted.—*E. N. Munns.*

580. Toumey, J. W. [Rev. of: Sampson, A. W. **Climate and plant growth in certain vegetative associations.** U. S. Dept. Agric. Bull. 700. 1918.] Jour. Forestry **17**: 59–62. 1919.

581. Turner, E. Phillips. **Reclamation of sand-dunes.** New Zealand Jour. Agric. **18**: 148. 1919.—It is pointed out that the reclamation operations should begin at the source of the sand-drift (in case of coastal dunes this is high water mark), and that trees should not be planted until (1) a protective littoral dune has been raised, or (2) a belt along the coast has been planted to Marram brass (*Ammophila arenaria*). The French method of building a littoral dune by means of sand-catching fences is described and directions are given for planting marram. Tree planting is done only on the landward side, with the following species for New Zealand conditions: *Pinus radiata* (*insignis*), *Cupressus macrocarpa*, *Pinus muricata*, *P. thunderbergii* and *P. densiflora*. In order to secure hardy stock a local nursery is advised. When a protective coastal belt has been established by means of marram and trees, the remainder may be reclaimed by a less expensive method, though the use of tree-lupins followed by prairie grass, clovers, trefoils, danthonia, microlaena and cocksfoot.—*E. R. Hodson.*

582. Van Dissel, E. D. **Treatment of the dunes in Holland.** New Zealand Jour. Agric. **18**: 150. 1919.—It is stated that the area of the dunes in Holland is 92,625 acres or about 1.15 per cent of the entire area. The method of fixation by planting marram grass (*Ammophila arenaria*) is described and the advantages of more permanent reclamation by means of afforestation are pointed out. Afforestation on the dunes of Schoorl, by the state, dates from 1865. In the early trials *Pinus laricio* var. *austriaca*, *P. montana*, *P. silvestris*, *P. maritima* and *Picea excelsa* were used. The first three species gave excellent results but *Pinus silvestris* succeeded only in sheltered places, while *Picea excelsa* and especially *Pinus maritima* were not successful. In 1893 new trials were made at the same place, in which *Picea alba* (used by Denmark and Jutland) was chiefly used, but it proves unsuited for afforesting the Dutch dunes. Subsequent work has been done with the successful species of the early trials, to which has been added *Pinus laricio corsicana*. *Pinus montana* is well suited to exposed sites, as it withstands violent winds and quickly covers the soil. Broad-leaved trees are used to some extent in the moist, sheltered places; alder and oak have given the best success. Difficulties encountered besides winds are included under damage by insects, fungi, fire and higher animals. The planting-stock used in this work should be raised in nurseries situated near or on the dunes.—*E. R. Hodson.*

583. Viardin, L. L'organisation forestiere, avant 1789, dans la Lorraine reconquise. [Forest organization in reconquered Lorraine prior to 1789.] Rev. Eaux et Forêts 57: 80–85. 1919.—The first representative of the forest hierarchy in Lorraine was the *gruyer* (a lord having a right on the woods of his vassals), who is referred to in public documents as early as the first half of the fourteenth century. On April 20, 1464, the office of *grand gruyer* of Lorraine was established under which were a number of individual *gruyers*. The latter, assisted by a *contrôleur*, acted both as a forest administrator and forest accountant, designating the timber to be cut, receiving receipts, and collecting fines resulting from trespasses. Following the French occupation in 1681, Louis XIV abolished the *grueries* and the *Maitrise royale* of Metz became the headquarters of forest administration in Lorraine, while in 1686 the Duchies of Lorraine and Bar were divided into 13 individual *maitrises*. The *contrôleurs* of the former *grueries* were replaced by special *receveurs* charged exclusively with collecting the returns from the forest. With the end of the French occupation, this organization was in turn abolished by Duke Leopold who reestablished the *grueries* while retaining the special *receveurs*. The former, relieved of their accounting duties by the *receveurs*, frequently added the duty of provost to their other duties. In 1701, the duchies were divided into five forest departments, each in charge of a *commissaire réformateur*, to which a sixth was added in 1720. These *commissaires reformateurs* constituted a special chamber in charge of all questions relating to the management of the forests, including cuttings, clearings, and the exercise of rights of user. In 1720, this chamber was joined with the Council of Finances to form the Council of Finances and of Waters and Forests. In 1727, the *commissaires réformateurs* were given the title of *grands gruyers*. From the coming of Stanislas in 1737, it was the Council of Finance and Commerce which exercised complete authority in all forest questions. In reality however, the Council was controlled in forest matters by Paul-François Gallois, who after, some difficulty succeeded in substituting the French system of *maîtrises* for the former *grueries*. The reorganization was completed in 1747 when Lorraine and Barrois were divided into 15 *maitrises*. Each of these was in charge of a *maître*, who was generally assisted by a lieutenant, an agent of the king (who was concerned particularly in controlling rights of user), a hammer keeper, a surveyor, a clerk, and from 1 to 10 bailiffs. These offices were all purchasable and all hereditary. On the death of Stanislas in 1766, Lorraine was reunited to France, and became the nineteenth department of forests and waters, and in 1789 on the death of Claude-Nicolas Mathieu, who had been *grand maître* of Waters and Forests in the Duchies of Lorraine and Bar, that office was discontinued.—*S. T. Dana.*

584. Weir, James R., and Ernest E. Hubert. The influence of thinning on western hemlock and grand fir infected with Echinodontium tinctorium. Jour. Forestry 17: 21–35. 1919.—Five plots aggregating 9.5 acres were laid out in the Priest River Valley, in Idaho, on potential timber land. The area was cut over in 1900 and 1902, and 57 hemlocks (*Tsuga heterophylla*) and 375 grand firs (*Abies grandis*) were growing in 1915. Following the cutting there was a decrease in the rate of diameter growth, due to opening the stand, followed by a decided increase in which hemlock took more part than did grand fir. With hemlock a marked second growth of the old crown took place, while with fir a secondary crown appeared on the lower trunk, in some cases extending nearly to the ground. The crown size of the trees in the cut-over area averaged 185 per cent greater than that of those of the virgin stand. The mean annual diameter growth on the cut-over area was found to be 143 per cent greater for hemlock and 176 per cent greater for grand fir, than was the case with the same species on the uncut area. While the injuries caused by logging were severe, there was a greater proportion of healed wounds on the cut-over area than on the uncut area. In general a less favorable set of conditions for fungous. activity existed on the cut-over area; the total numbers of infected trees, of sporophores, and of sporophore-bearing trees, on the cut were less than on the uncut area. This is probably due to the removal of the infected trees on the former area. The thinning exerts a restrictive influence on *Echinodontium tinctorium*, due to better growing conditions for the trees, increased light and amelioration of stagnant-air conditions.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

585. Adami, I. G. Medical contributions to the study of evolution. *xviii + 372p.* Duckworth: London, 1918.—This volume of lectures and addresses is divided into three parts. The first part, on adaptation and disease, contains the author's Croonian Lectures before the Royal College of Physicians in 1917. These lectures contain an epitome of the author's views on present evolutionary problems, and are particularly valuable for their numerous references to the data of variability and mutation in bacteria and the origin of zymotic diseases. Among the main points emphasized are the phenomena of "direct adaptation" in bacteria, numerous cases being cited in support of this view, some of which are difficult to explain on any other basis. A broad discussion of antitoxins, acquired immunity and related problems leads to a neo-Lamarckian position, based also upon experiments on intoxication of germ cells, etc. Chapter VI discusses "The physico-chemical basis of immunity and of evolution," and develops the conception, long since expressed by Adami, of the "biophoric molecule" as a proteidogenous unit having "vital and heritable properties" and composed of rings or chains of amino-acids, with a "nucleus" composed of a central amphoteric glycocoll group, to which are attached varying orders of side chains. This conception is applied in some detail to such phenomena as growth, enzyme action and anaphylaxis. These lectures contain vigorous attacks upon the Batesonian and Weismannian positions.—In parts II and III are reprinted articles and addresses published or delivered on both side of the Atlantic. Under the general headings "Heredity and adaptation" and "Growth and overgrowth" are included such diverse topics as variability in bacteria, inheritance of acquired conditions in man, inflammation, liquid crystals, Weismannism, classification of tumors, and various aspects of cancerous growths. This book serves to emphasize the reviving interest in neo-Lamarckianism on a physico-chemical basis —*R. R. Gates.*

586. Anonymous. Disease resistance in plants. Gard. Chron. 65: 192. Apr. 19, 1919.—Discussion of current hypotheses of the physiology of disease resistance —*John Bushnell.*

587. Anonymous. Self-sterility in fruit trees. Gard. Chron. 64: 238. Dec. 14, 1918.—Editorial review of: Sutton, Ida. Report on tests of self-fertility in plums, cherries, and apples at the John Innes Horticultural Institution. Jour. Genetics 7: 281–300. 1918.—*John Bushnell.*

588. Anonymous [J. F.] Variability in plants. Gard. Chron. 65: 285–286. June 7, 1919.—See Bot. Absts. 3, Entry 973.

589. Anonymous [J. F.] Variability in plants. Gard. Chron. 65: 321. June 28, 1919.—See Bot. Absts. 3, Entry 974.

590. Anonymous. Inheritance studies with poultry at the Rhode Island Agric. Experiment Station. Bull. Rhode Island State College 13: 41–42. 1918.—See Bot. Absts. 3, Entry 1470.

591. Anonymous. Six hundred twins already discovered. Jour. Heredity 10: 210. May, 1919.

592. Anonymous. The inheritance of blindness. Jour. Heredity 10: 211. May, 1919.

593. Arny, A. C., and H. K. Hayes. Experiments in field technique in plat tests. Jour. Agric. Res. 15: 251–262. 1918.—See Bot. Absts. 3, Entry 976.

594. Bateson, W. Studies in variegation. I. Jour. Genetics 8: 93–99. *Pl. 3–4, 1 fig.* April, 1919.—Reports bud variations on variegated plants giving branches, leaves, and sectors of leaves (1) pure green, (2) pure white, and (3) with reversal of green and white layers of cells. Reversals giving green-skinned sports on white-skinned chimaeras are described for

Euonymus japonicus latifolius var. *variegata*, and for three varieties of *Pelargonium*. The white-skinned and green-skinned varieties of *Coprosma Baueri* are described. The various sports are illustrated by 16 excellent figures in color, and one text figure shows the distribution of chlorophyll-and non-chlorophyll-bearing cells in *Euonymus*. Reversals in periclinal chimaeras are considered to be rare and due to some instability in the growing point, such as a greater vigor of the green core, or to injury.

Author suggests that the phenomena of reversal in variegated periclinal chimaeras may be duplicated in respect to somatic and genetic distinctions in characters not thus visible, thereby bringing about changes in the properties of the layer from which germ cells arise.—*A. B. Stout.*

595. Bateson, W., and Ida Sutton. **Double flowers and sex linkage in Begonia.** Jour. Genetics 8: 199–207. *Pl. 8.* June, 1919.—See Bot. Absts. 3, Entry 978.

596. Beauverie, J. **Les méthodes de selection appliquées aux céréales de sémences. État actuel de la question. [Methods of selection applied to seed grains. Present status of the matter.]** Rev. Gén. Sci. Pur. et Appl. 30: 79–87, 108–114. 1919.—Summarizing the work of Biffen, Nilsson, and others, author points out that the method of selecting the best seeds, year after year, of a mixture of strains seldom leads to the establishment of a superior variety with any degree of permanence, the quality of the seeds produced varying from year to year according to weather, cultural, and other conditions, with an undue proportion of inferior seeds in each crop. On the other hand, selecting from the progeny of a single individual, that is, in a "pure line" or in "pedigreed" stock, one has the chance of finding strains which will be permanently superior, year after year. In these strains some characters are fixed, such as the shape, color, and roughness of the grains; some vary with the conditions, such as length of stems, and weight of grains, though being more or less controlled by heredity; while still others vary entirely with the conditions of culture. But in the pure line the behavior of the individual as influenced by circumstances is not necessarily repeated in its own descendants, the behavior of the latter being controlled by its ancestors. There are doubtless many "pure lines" in nature, not recognized or recognizable. Occasionally one of these may "sport" or mutate, in a striking and desired manner, or a striking and desired change may come about by accidental crossing. Man takes advantage of the possibility of crossing, and by deliberate hybridizing may secure a new and desired combination of characters already existing, such as superior fecundity with disease resistance, resistance to cold, etc. The paper also includes an historical sketch of the development of plant breeding through pedigree cultures at seed-control stations in various countries of the world, recognition of the leaders, and a statement of some of their main results.—*G. J. Peirce.*

597. Bensaude, Mathilde. **Recherches sur le cycle évolutif et la sexualité chez les Basidiomycètes. [Researches on the evolutive cycle and sexuality in the Basidiomycetes.]** *156 p., pl. 1–3, fig. 30.* [Dissertation.] Nemours, 1918.—"Miss Bensaude has investigated *Coprinus fimentarius*, *Armillaria mucida*, and *Tricholoma nudum*. The work includes two phases: (1) the morphology and cytology of the mycelia, and (2) the results obtained from the study of the single spore cultures of *C. fimentarius*.—The mycelia of the 3 species were obtained from germinating spores as well as from material collected in the field. The author accepts Falck's classification of the mycelia into primary, secondary, and tertiary forms. The claim is made that the first few days after the germination of the spores the resulting mycelia belong to the primary class, in which the hyphae are partioned off into cells which contain from one to many nuclei. These uninucleate cells may give rise to varying numbers of uninucleate oidia. Disarticulated hyphal cells, which she calls "pseudoidia," are also formed which, like true oidia, may germinate. The nuclei in the germ tubes divide amitotically. Cross-walls with clamp connections never appear in the hyphae of the primary mycelia. Miss Bensaude grew single spores of *C. fimentarius* in pure cultures, and succeeded in isolating 10 single spores. Of these, 4 germinated, and in 2 cultures primary mycelia were obtained which did not produce carpophores. When parts of each mycelium were mixed in a culture, a secondary mycelium

appeared and fruit bodies were produced. The chief method of bringing about the plasmogamy is through the union of a hyphal cell of one thallus with an oidium from another thallus. Miss Bensaude concludes that the "dicaryo" in *C. fimentarius* is formed following plasmogamy between cells coming from two different thalli.—The transformation of a primary mycelium into a secondary mycelium is very difficult to observe. This is brought about by the anastomosis of 2 hyphal cells of different thalli in *C. fimentarius*. The fusion of 2 such cells (plasmogamy or pseudogamy) introduces the cytoplasm and nucleus or nuclei of one cell into the other, which results in the establishment of a binucleate cell. If 2 cells unite which have more than 2 nuclei in common, all disintegrate but 2. The uninucleate oidium may fuse with a hyphal cell, and this is a very common means of bringing about the initial binucleate condition of the cell.—Each cell in these secondary hyphae is binucleate, constituting a "dicaryon." Conjugate nuclear division occurs in these hyphae as a rule in the apical cell, although intercalary cells divide occasionally. At the time of division the 2 nuclei move to the middle of the cell, and the actual process of cell division is preceded by the formation of a protuberance which is to form a clamp. One of the nuclei which Miss Bensaude calls (+) on the basis of her results with single spore cultures, enters this very short branch, and the (−) nucleus remains at about the same level in the mother cell. Spindles are formed and conjugate nuclear division takes place. One of the (+) daughter nuclei goes back into the mother cell, and the other goes to the apex of the young clamp. A cross-wall cuts off the beak cell from the mother cell. Of the 2 (−) daughter nuclei, one goes to the apical part of the mother cell and the other to the basal part, and a cross-wall is formed at the level of the young clamp, dividing the cell into an apical portion with (+) and (−) daughter nuclei and a basal cell with only the (−) daughter nucleus. The little beak now fuses with the basal cell, and its nucleus passes into this cell, so that it also becomes binucleate. Very often the apex of the beak fuses with the mother cell before nuclear division takes place.—Reversion of secondary to primary mycelium occurs, in which case a uninucleate cell appears among binucleate cells. No clamps are found on the cross-walls of this cell, and these uninucleate cells may bear oidia." [Through rev. in Bot. Gaz. **68**: 67–68. July, 1919.] See also Bot. Absts. 3. Entries 347 and 644.—*Michael Levine.*

598. Boulenger, G. A. **L'évolution est-elle réversible? Considérations au sujet de certains poissons. [Is evolution reversible? Considerations relating to certain fishes.]** Compt. Rend. Acad. Sci. Paris **168**: 41–44. 1919.—Conclusions regarding relationships of groups have often rested on belief that evolution never reverses itself. Author believes such reverses have occurred. In fishes of family Cichlidae primitive teeth were undoubtedly conical. Many African members have bi- or tri-cuspid teeth, and in some of them conical and bi- or tri-cuspid mixed. Young fishes, however, have bi- or tri-cuspid teeth, older ones conical, indicating that evolutionary trend is now back toward conical shape. Concludes also that in evolution of this family the number of vertebrae was reduced to about 24, but subsequently increased to 30 or more in African forms whose dentition is aberrant, thus constituting another reversal. Other more obscure evidences of reversal of evolution are found in same family.—*A. Franklin Shull.*

599. Boulenger, G. A. **Un cas d'évolution ontogénique a rebours chez un lézard africain (Eremias lugubris A. Smith). [A case of reversed ontogenetic evolution in an African lizard.]** Compt. Rend. Acad. Sci. Paris **168**: 78–80. 1919.—These lizards descended from striped ancestors, and adults are striped at present. Some young, however, show stripes broken up into spots, which later elongate and unite to form stripes. Is regarded as case of reversed ontogeny. Author speculates also concerning purpose of jet black and bright color-pattern of young, as compared with gray and pale yellow and tan of adult, so similar to desert regions, but reaches no conclusion.—*A. Franklin Shull.*

600. Boveri, Theodor. **Zwei Fehlerquellen bei Merogonieversuchen und die Entwicklungsfähigkeit merogonischer und partiellmerogonischer Seeigelbastarde. [Two sources of error in investigations of merogony and the ability of merogonic and partially merogonic sea-urchin hybrids to develop.** Arch. Entwicklungsmech. Organ. **44**: 417–471. *3 pl.* 1918.—Unfinished

posthumous article, pointing out two facts which help explain conflicting results of echinoderm crosses. First, whole eggs or egg fragments which have been taken and appear to have no nuclei may contain chromatin of nucleus in irregular mass not recognizable in living protoplasm; and this chromatin is capable of normal participation in development. Second, nucleus may be divided into two or more partial nuclei, probably due to failure of chromosome vesicles to coalesce at proper stage in reconstruction of nucleus. These two discoveries are used to explain facts taken from literature and from new experiments. Egg fragments of *Sphaerechinus* apparently without nuclei, fertilized by sperm of *Paracentrotus* (*Strongylocentrotus*), yielded some paternal larvae (as previously reported), but majority were intermediate larvae. But intermediate larvae had large nuclei, hence were diploid, for author confirms former conclusion that nuclear size is safe criterion of haploid or diploid number of chromosomes. Egg fragments in these cases must have contained nuclei. Disappearance of nucleus on shaking occurs only in young eggs, probably just after polar-body formation. In fully ripe female only few eggs are in this stage, while nuclei of older eggs resist disintegration on shaking. One supposedly merogonous larva from *Sphaerechinus* × *Paracentrotus* (female named first) was nearly paternal. It had smaller nuclei than genuine hybrids, but not small enough to be haploid. Author concludes egg fragment contained only partial nucleus. Some larvae of same cross were maternal, and these have been shown to be plainly haploid. In one set of crosses *Sphaerechinus* × *Parechinus* (*Echinus*) many larvae died early; these were probably haploid. Those that lived longer were probably not haploid, yet some were paternal. However, crosses involving whole egg of *Sphaerechinus* are sometimes paternal. Suggests that when "merogonous" larvae were paternal egg fragment contained partial nucleus, and that these maternal chromosomes helped develop larva to pluteus stage at which paternal characters could appear. Godlewski's merogonous *Parechinus* × *Antedon* crosses gave some maternal embryos, but author suspects egg fragments contained nuclei; nuclear size was not determined in these larvae.—Some larvae have nuclei of haploid size on one side, diploid size on other. These are attributed to partial merogony, dispermy in which one sperm nucleus fuses with egg nucleus, other functions alone. In partial merogonous larvae of crosses *Sphaerechinus* × *Paracentrotus* and *Sphaerechinus* × *Parechinus* diploid and haploid cells migrate and mix, making certain characteristics intermediate. If two cleavage spindles resulting from dispermy be placed, not parallel, but perpendicular to one another, all micromeres, and hence mesenchyme, might be diploid. One merogonous larva appeared to be in this condition, its gut and mesenchyme being diploid and its skeleton normal. Some doubtful cases are described.—Author suggests two stages of development, early stage in which any chromosomes will suffice for development, later stage in which right interchromosomal combination must be present, as well as mutually compatible cytoplasm and chromosomes. Explains why hybrids between *Sphaerechinus* and either *Paracentrotus* or *Parechinus* can be paternal only when maternal nucleus is also present: maternal nucleus is necessary in order that development may proceed into second stage when paternal characters can appear. Nucleus is not, however, merely organ to insure development: giant eggs formerly shown, in crosses, to produce more nearly maternal embryos than did normal eggs in similar crosses owed that property to their double nuclei. Moreover, hybrids from egg fragments were not less like mother than were hybrids from whole eggs, as they would be if cytoplasm determined characters.—*A. Franklin Shull.*

601. Bridges, Calvin B. **The genetics of purple eye-color in Drosophila melanogaster.** Jour. Exp. Zoöl. 28: 265–305. May 20, 1919.—Purple is an early mutation (found Feb. 20, 1912) that has proved especially useful. It is strictly recessive, easily and rapidly separable from wild-type, fully viable, fertile, and productive. Its locus is in second chromosome 6.2 units to right of black, or 52.7 to right of star. This is middle of second chromosome as mapped, and apparently also in actuality, since this region is characterized by abnormally high double crossing over, special sensitivity to action of age, heat, and cold upon amount of crossing over, and by special limitation upon action of certain genetic crossover variations. Purple has been involved in development of many important fields of *Drosophila* genetics: with vermilion it gave "intensification" or "disproportionate modification." It has

been model for repeated "mimic" mutations and has itself been "recurrent." Purple was used most extensively in early analysis of autosomal linkage—coupling F_2, back-cross test of crossing over in both male and female, two-point map, three-point map, etc. Coincidence curve for age-variation in crossing over is roughly mirror image of crossover curve for age-variation, while coincidence curve for temperature-variation in crossing over seems to be straight line independent of temperature curve of crossing over. Age and temperature variations in crossing over seem therefore to depend on two different physiological factors affecting respectively "internode length" and "coefficient of crossing over."—*Calvin B. Bridges.*

602. Bridges, Calvin B. **Specific modifiers of eosin eye color in Drosophila melanogaster.** Jour. Exp. Zoöl. 28: 337–384. July 5, 1919.—See Bot. Absts. 3, Entry 2092.

603. Bridges, Calvin B. **Vermilion-deficiency.** Jour. Gen. Physiol. 1: 645–656. July 20, 1919.—See Bot. Absts. 3, Entry 982.

604. Brown, N. E. **The defertilization of flowers by insects.** Gard. Chron. 63: 4. 1918. —Author observed a Syrphid fly eating the pollen from anther and stigma of a *Pelargonium* flower.—*John Bushnell.*

605. Coe, H. S. **Origin of the Georgia and Alabama varieties of velvet bean.** Jour. Amer. Soc. Agron. 10: 175–179. *2 fig.* 1918.—See Bot. Absts. 3, 1471.

606. Collins, E. J. **Sex segregation in the Bryophyta.** Jour. Genetics 8: 139–146. *Pl. 6, 5 fig.* June, 1919.—See Bot. Absts. 3, Entry 2103.

607. Collins, G. N. **Intolerance of maize to self-fertilization.** Jour. Washington, D. C., Acad. Sci. 9: 309–312. June 4, 1919. Of several hundred strains of maize (*Zea*) which have been repeatedly self-fertilized only one has been discovered which does not suffer a loss of vigor in consequence.—This intolerance of self-fertilization is difficult to reconcile with the flowering habits of maize, most varieties of which are synacmic or slightly proterandrous. It is pointed out that a slight departure from synacmy toward proterogyny would not only increase the chances for cross-fertilization, but would also insure complete fertility when climatic conditions were unfavorable for the distribution of pollen.—An explanation of the combination of synacmy with an intolerance to self-fertilization is suggested by the idea of the hybrid origin of this species. *Euchlaena* the nearest relative of maize and generally regarded as an ancestor shows no measurable reduction of vigor as a result of self-fertilization. It must be assumed therefore that the intolerance of self-fertilization is a character derived from some source other than *Euchlaena.* It does not seem unreasonable to suppose that the ancestor possessing this intolerance would have also some means of insuring cross fertilization. Perfect-flowered spikelets and androgynous inflorescences of maize are proterogynous. The sexes, however, are normally separated, the male inflorescence occupying a terminal and the female inflorescence a lateral position on the plant. Terminal inflorescences mature before lateral and the delay attendant on a lateral position neutralizes the natural proterogyny. The conclusion is reached that the unknown ancestor of maize was perfect-flowered and was protected from self-fertilization by complete proterogyny. While maize retains the intolerance of self-fertilization of this perfect-flowered, proterogynous ancestor the protective proterogyny is lost through the separation of the sexes, a characteristic derived from *Euchlaena.*—*J. H. Kempton.*

608. Connors, C. H. **Methods in breeding peaches.** Proc. Amer. Soc. Hortic. Sci. 14 (1917): 126–127. 1918.—Early attempts in trying to cross peaches when paper bags were used, proved practically negative. Mosquito netting shows slightly better results, but not entirely satisfactory. Later attempts were made to enclose entire tree with cheese cloth supported on framework, with quite satisfactory results.—Object was to study inheritance of size of blossoms. It was first thought that size of blossom might be due to hybridization, but is now known that all sizes are found in the wild forms in China. Crosses and selfings were made.

Early freestones and semi-clings give about 10 per cent from stone to tree, later freestones give, up to 50 per cent.—Total of 403 trees of known parentage were planted in spring of 1916, and 1073, in 1917. No method is yet devised to secure F_1 generation. [See Bot. Absts. 2, Entry 724.]—*C. E. Myers.*

609. COULTER, MERLE C. **Inheritance in Pediastrum.** [Rev. of: HARPER, R. A. **Organization, reproduction, and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 66: 375–439. *Pl. 5–6, fig. 54.* 1918.] Bot. Gaz. 67: 513–514. June, 1919.—Many complexities occur in reproductive processes of flowering plants, and reviewer conceives that studies on lower organisms promise to have profound bearing on theoretical genetics. He thinks however that the peculiarities of *Pediastrum* make doubtful the applicability of author's conclusions to higher plants, though he sees that there may be something comparable between the method of colony formation in *Pediastrum* and the arrangement of nuclei in early stage of embryo formation in gymnosperms and arrangement of nuclei in the embryo-sac of angiosperms.—*G. H. Shull.*

610. COULTER, MERLE C. **Mendelian inheritance in gametophytes.** [Rev. of: TRANSEAU, EDGAR NELSON. **Hybrids among species of Spirogyra.** Amer. Nat. 53: 109–119. *Fig. 7.* 1919. (See Bot. Absts. 2, Entry 715.)] Bot. Gaz. 67: 514–515. June, 1919.—Reviewer considers behavior of gametophyte generation one of most critical tests of current theoretical mechanism of inheritance, and thinks the lower plants especially favorable material for such studies. Predicts that segregation will be found taking place in the first generation and there should be no dominance. Transeau's studies were purely observational but are taken to agree with this expectation. Reviewer hopes that the author will find means of studying the hybrid *Spyrogyras* "under rigid experimental control."—*G. H. Shull.*

611. COULTER, MERLE C. **A corn pollinator.** Bot. Gaz. 68: 63–64. *1 fig.* July, 1919.—See Bot. Absts. 3, Entry 989.

612. COULTER, MERLE C. **A new conception of sex.** [Rev. of: JONES, W. N. **On the nature of fertilization and sex.** New Phytol. 17: 167–188. 1918.] Bot. Gaz. 68: 68–69. July, 1919.

613. COULTER, MERLE C. **Self-sterility.** [Rev. of: EAST, E. M., AND J. B. PARK. **Studies on self-sterile plants. II. Pollen-tube growth.** Genetics 3: 353–366. *3 fig.* 1918.] Bot. Gaz. 68: 70–71. July, 1919.

614. COWGILL, H. B. **Cross-pollination of sugar cane.** Jour. Amer. Soc. Agron. 10: 302–306. 1919.—See bot. Absts. 3, Entry 2106.

615. COWGILL, H. B. **Studies in inheritance in sugar cane.** Jour. Dept. Agric. Porto Rico 2: 33–41. 1918.—See Bot. Absts. 3, Entry 2107.

616. DAHLGREN, K. V. OSSIAN. **Erblichkeitsversuche mit einer dekandrischen Capsella bursa-pastoris (L.) [Genetical experiments with a decandrous Capsella bursa-pastoris.]** Svensk. Bot. Tidsskr. 13[1]: 48–60. *2 fig.* 1919.—The author relates some results obtained by crossing a constant type of *Capsella bursa-pastoris* having petals transformed into stamens, with *Capsella Heegeri* and two of Almquist's "elementary species" of *C. bursa-pastoris* (viz., *C. collina* and *C. emarginata*).—Apetalous forms are not a uniform race. The apetaly can be produced either by abortion of the petals or by their transformation into stamens. By unfavorable nourishment petals and stamens sometimes disappear and real female flowers (fertile) may be obtained.—In F_1 the apetalous type prevails, but small petals or intermediate forms between petals and stamens are seen. In F_2 segregation takes place according to the proportion 3 : 1, if we consider apetalous individuals (*EE*) and heterozygotes (*Ee*) as one group. These two categories are rather difficult to separate. In some families the number of individuals with petals was too great. This might be caused by foreign seeds in the soil.—

By crossing with *C. Heegeri*, a segregation concerning capsule form took place in the proportion 15 : 1, as has been first observed by Shull. If *Ee* and *EE* [in original paper by a mistake these were written *Ee* and *ee*] are considered as one group, the segregation will be 45 : 15 : 3 : 1. Results were as follows:—

	Obtained	Calculated
C. bursa-pastoris apetala	298	288.98 ± 9.26
C. bursa-pastoris normalis	96	96.33 ± 8.59
C. Heegeri apetala	14	19.27 ± 4.29
C. Heegeri normalis	3	6.42 ± 2.51

Many disappointing crossings were made between *Capsella grandiflora* and other *Capsella* forms. A flowering F_1 plant has perhaps been produced; this one however did not give any seeds. [See Bot. Absts. 3, Entry 1473.]—*K. V. Ossian Dahlgren.*

617. Danforth, C. H. **Evidence that germ cells are subject to selection on the basis of their genetic potentialities.** Jour. Exp. Zoöl. **28**: 385–412. July 5, 1919.—See Bot. Absts. 3, Entry 990.

618. Dehaut, E. G. **Développement en sens inverse de la coloration verte, chez Lacerta muralis tiliguerta et L. mur. quadrilineata. [Development of green coloration in reverse direction in Lacerta muralis tiliguerta and L. m. quadrilineata.]** Compt. Rend. Soc. Biol. France **82**: 514–515. May 17, 1919.—See Bot. Absts. 3, Entry 1474.

619. Dehaut, E. G. **Interversion d'un caractère cranien dans certaines races du Sus scrofa. [Interversion of a cranial character in certain races of Sus scrofa.]** Compt. Rend. Soc. Biol. France **82**: 515–516. May 17, 1919.—See Bot. Absts. 3, Entry 1475.

620. Delphin, L. [Rev. of: Downing, Elliot R. **The third and fourth generation. An introduction to heredity.** *164 p., 13 fig.* University of Chicago Press: Chicago. 1918.] Rev. Gén. Sci. Puré et Appl. **30**: 58. 1919.

621. Doncaster, L. **Note on an experiment dealing with mutation in bacteria.** Proc. Cambridge Phil. Soc. **19**: 269. 1919.—See Bot. Absts. 3, Entry 823.

622. Dorsey, M. J. **A note on the dropping of flowers in the potato.** Jour. Heredity **10**: 226–228. *Fig. 19.* May, 1919.

623. Drieberg, C. **A freak papaw (Carica Papaya).** Jour. Heredity **10**: 207. May, 1919.

624. Duerden, J. E. **Crossing the North African and South African ostrich.** Jour. Genetics **8**: 155–198. *Pl. 7, 2 fig.* June, 1919.—See Bot. Absts. 3, Entry 2118.

625. Edmonds, M. E., and P. Sargeant. **Variability in plants.** Gard. Chron. **65**: 299. June 14, 1919.—See Bot. Absts. 3, Entry 993.

626. Enriques, Paola. [French rev. of: Maiocco, F. L. **Le leggi di Mendel e l'eredita [Les lois de Mendel et l'hérédité]. [Mendel's law and heredity.]** *222 p.* Fratelli Bocca: Torino, 1918.] Scientia **25**: 510–511. 1919.

627. Falck, K. **De första grunderna av ärftlighetsläran. [On the first principles of genetical science.** *25 p.* Stockholm, 1919.—Small pamphlet written for use in schools.—*K.V. Ossian Dahlgren.*

628. Faure, Ch. **Note sur un cas d'hermaphroditisme rudimentaire chez le coq. [Note on a case of rudimentary hermaphroditism in the cock.]** Compt. Rend. Soc. Biol. France **82**: 519–520. May 17. 1919.—See Bot. Absts, 3, Entry 1480.

629. FREEMAN, GEO. F. Heredity of quantitative characters in wheat. Genetics 4: 1–93. Jan., 1919.—Number of reciprocal crosses were made between an Algerian white macaroni wheat, an Algerian red bread wheat, and two white bread wheats, Early Baart and Sonora. All facts observed on inheritance of date of first head, height of plant, width of broadest leaf, are in harmony with hypothesis of segregation of a number of simple Mendelian unit characters. Constants employed to measure variability were standard deviation of time of heading and coefficient of variation of height and leaf width.—All crosses produced normal F_1 plants usually somewhat above average in size. Sterile seeds and plants and vegetatively deficient plants occurred in F_2 and F_3 of macaroni-bread wheat crosses, probably the results of recombination of Mendelian unit factors. If blending inheritance occurred, F_1 would have shown abnormality. In nearly all crosses, the behavior of F_3 cultures from selected F_2 plants indicated clearly the existence of genetic differences in F_2 explainable only as the result of recombination of several unit factors.—Heterozygosity in F_2 and F_3 of the macaroni-bread wheat crosses is shown by marked greater variability in hybrid populotions. Differences in variability between F_2 and F_3 show increasing homozygosity in F_2.—In size characters, macaroni-bread wheat crosses gave hybrids less in average size than parents but much greater in variability. Bread wheat hybrids were intermediate or greater in size but no more variable than parents. Tall and wide-leaved cultures from genetically equivalent hybrid groups and from pure lines as well were uniformly less variable than short and narrow-leaved cultures. Some suppression factor appears to reduce variability in races with high means resulting from increased vegetative growth. Size factors seem to produce greater variability in combinations producing results below the mean of the hybrid population. This effect suppressed nearly all extra variability due to heterozygosity in the bread wheat hybrids. Recent literature is reviewed.—*Breeze Boyack.*

630. FREEMAN, G. F. A mechanical explanation of progressive changes in the proportion of hard and soft kernels in wheat. Jour. Amer. Soc. Agron. 10: 23–28. 1918.—See Bot. Absts. 3, Entry 2125.

631. GOODSPEED, T. H., AND PIRIE DAVIDSON. Controlled pollination in Nicotiana. Univ. California Publ. (Bot.) 5: 429–434. 1918.—See Bot. Absts. 3, Entry 998.

632. GOWEN, J. W. Inheritance studies of color and horn characteristics. Maine Agric. Exp. Sta. Bull. 272. *127–148 p., 4 fig.* 1918.—See Bot. Absts. 3, Entry 999.

633. HARLAND, S. C. Tomato breeding in St. Vincent. Agric. News Barbados 17: 4–5. 1918.—St. Vincent native tomato is perennial, grows very vigorously and produces smooth, regularly shaped fruits about 1½ inches in diameter. Fruits contain many seeds and are very acid in taste. This native variety is unaffected by "Blossom-end rot" although sometimes attacked by the bacterial disease due to *Bacterium solanacearum.*—F_1 and F_2 crosses between native variety and Ponderosa have been studied. The F_1 generation proved uniform. Quality of fruit and fruit size were intermediate between the parents. F_1 fruits were slightly subject to "Blossom-end rot." In F_2 segregation occurred for all differential characters. There was an enormous range of sizes and shapes of fruits although no plant produced fruit as large as Ponderosa or as small as the native variety. Segregation occurred for habit of plant and quality of fruit.—Many F_2 plants were attacked by "Blossom-end rot" while others were apparently immune to this affection. Some plants were more resistant to the disease caused by *B. solanacearum*, than others, although none were immune.—*H. K. Hayes.*

634. HARRISON, J. B. Seedling sugar canes. Internat. Sugar Jour. 20: 558–560. 1918. Also: same title. Agric. News Barbados 17: 289–290. 1918.

635. HENDRICKSON, A. H. Five years results in plum pollination. Proc. Amer. Soc. Hortic. Sci. 15 (1918): 65–66. 1919.—Work covers a period of five years involving 100,000 hand-pollinations to determine effect of selfing and crossing, and more than 175,000 blossoms were counted to secure per cent of set under normal orchard conditions. Results were consistent

for the various years of the test. Of the eight varieties of the Japanese type studied, seven were self-sterile, and one partly self-fertile. Of the nine varieties of the European type studied, three were clearly self-sterile and the others were somewhat uncer ain. Varieties of each type effectively cross-pollinate one another when respective blossoming periods are coincident. [See Bot. Absts. 2, Entry 727.]—*C. E. Myers.*

636. Hunter, Capt. H. **The improvement of the barley crop.** Jour. Dept. Agric. Ireland **19**: 139–159.. *Fig.1–11.* 1919. The greater part of this paper is a description of methods for performing (1) a progeny performance-test of pure lines derived from commercial varieties of barley and (2) the extraction of desirable commercial types from crosses of strains containing valuable characters of which a recombination is desired. Selected cases of improved pure lines of Archer and Goldthorpe varieties isolated in the progeny performance-test are cited. The hybridization work consists of crosses of Archer, Goldthorpe and Spratt varieties of barley. Selections of plants carrying a recombination of the two parent types were made and tested for length of straw, yield and nitrogen content. Photographs and descriptions of isolated strains which proved worthy are given. In a cross of Archer × Spratt, the broad- and narrow-eared character is followed through three generations. The broad-eared type behaves as a recessive to the narrow-eared.—*John W. Gowen.*

637. Jones, W. N. **On the nature of fertilization and sex.** New Phytol. **17**: 167–188. 1918.—See Bot. Absts. 3, Entries 612, 1486.

638. Jordan, David Starr. **War and genetic values.** Jour. Heredity **10**: 223–225. May, 1919.

639. Kempton, J. H. **Inheritance of waxy endosperm in maize.** U. S. Dept. Agric. Bull. 754. *99 p., 14 fig.* June 26, 1919.—See Bot. Absts. 3, Entry 2154.

640. Kottur, G. L. **Note on protecting the cotton flowers from natural crossing.** Poona Agric. Coll. Mag. **9**: 131–132. *3 fig.* 1918.—See Bot. Absts. 3, Entry 2156.

641. Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato (Lycopersicum esculentum).** Oregon Agric. Exp. Sta Bull. 149. *90 p., 22 fig.* 1918.—See Bot. Absts. 1, Entry 1402; 3, Entry 1488.

642. Lankester, Sir Ray. **The terminology of parthenogenesis.** Quart. Jour. Microsc. Sci. **63**: 531–536. Apr., 1919.—See Bot. Absts. 3, Entry 1010.

643. Laughlin, H. H. **Population schedule for the census of 1920.** Jour. Heredity **10**: 208–210. May, 1919.

644. Levine, Michael. **Life history and sexuality of Basidiomycetes.** [Rev. of: Bensaude, Mathilde. **Recherches sur le cycle évolutif et la sexualité chez le Basidiomycètes. [Researches on the evolutive cycle and sexuality in the Basidiomycetes.]** *156 p., pl. 1–3, fig. 30.* [Dissertation.] Nemours, 1918. [Bot. Absts. 3, Entry 597.] Bot. Gaz. **68**: 67–68. July, 1919.

645. Lombarteix, Jean Marie. **Les sémis comme moyen de combattre la dégénérescence de la pomme de terre. [Seeds as means of combatting degeneration in the potato.]** Rev. Hortic. **90**: 170. Oct., 1918.—Author states that in France the old varieties of potatoes are degenerating. Not only is yield reduced but the plants are becoming more susceptible to disease. This degeneration is attributed to continued vegetative propagation which results in reduction of vigor and consequent loss of disease resistance. It is held that, in all species which may be propagated by both seeds and cuttings, seedlings are more vigorous than plants propagated vegetatively.—It was found that vigor, yield and disease resistance were restored completely by using for seed potatoes the tubers produced by plants grown from seed. The varietal characteristics of the potatoes secured by this method closely resembled those of the parental variety.—*J. H. Kempton.*

646. Love, H. H., and W. T. Craig. Methods used and results obtained in cereal investigations at the Cornell Station. Jour. Amer. Soc. Agron. 10: 145–157. *1 pl., 1 fig.* 1918.—See Bot. Absts. 3, Entry 2163.

647. Love, H. H., and W. T. Craig. Fertile wheat-rye hybrids. Jour. Heredity 10: 195–207. *11 fig.* May, 1919.

648. Lundborg, H. Rasfrågor i modern belysning. Populär handledning under midverkan av fackmän utgiven av. [Race questions in modern light. A popular manual issued in association with other specialists.] *VI + 144 p.* P. A. Norstedt & Söners: Stockholm, 1919.—This work was published in connection with an exhibition of Swedish racial types and contains the following treatises:

(1) O. Almgren. On the origin of the Swedish people in light of the prehistorical remains.

(2) G. Backman. On the origin of the Swedish people and its genetical constitution according to anthropology.

(3) R. Nordenstreng. On Finlanders and Lapponians.

(4) E. Hillerstrom. On walloons and their descendants in Sweden.

(5) H. Valentin. On the Jews in Sweden.

(6) A. Thesloff. On gypsies and "tattare."

(7) N. v. Hofsten. On heredity in the light of modern science.

(8) H. Lundborg. On eugenical ideas and essays of our time.

(9) H. Lundborg. On the mixing of races and marriages between relatives from a biological view.—*K. V. Ossian Dahlgren.*

649. Macoun, W. T. Apple breeding in Canada. Agric. Gaz. Canada 5: 126–128. 1918.—Summarizes apple breeding in Canada, most of which has been carried on since 1890. At the Central Experimental Farm 115 new varieties have been named. A number of seeds were planted in 1898 which were saved in an orchard containing 400 to 500 named varieties. Seeds were saved from those varieties which were most promising. Of 1211 seedlings, which have borne fruit, 378 are worthy of further trial. Some crosses made by Dr. Wm. Saunders proved more hardy than any other varieties of apples or crabs yet tested. Some of the hardier of these have been recrossed with named varieties of apples with the hope of obtaining hardier varieties with larger fruit. Seed was sown in 1910 from hardiest Russian apples and 75,000 seedlings are being tested for hardiness at the Dominion Experimental Farms in the prairie provinces.—Conclusions regarding method of origination of new varieties are given. Two methods are favored: (1) Sow seeds of varieties which most nearly approach the desired characters. Save seeds, if possible, from an orchard containing several varieties, which have the desired characters, as natural crossing will give many combinations. (2) Crossing of known varieties which most nearly approach the desired characters. The Siberian crab apple (*Pyrus baccata*) crossed with the apple should give hardier apple varieties.—*H. K. Hayes.*

650. Maiocco, F. L. Le leggi di Mendel e l'eredita. [Mendel's law of heredity.] *222 p.* Fratelli Bocca: Torino, 1918.—See Bot. Absts. 3, Entry 626.

651. Meyer, A. W. The occurrence of superfoetation. Jour. Amer. Med. Assoc. 72: 769–774. 1919.—See Bot. Absts. 3, Entry 1497.

652. Moore, Carl R. On the physiological properties of the gonads as controllers of somatic and psychical characteristics. II. Growth of gouadectomized male and female rats. Jour. Exp. Zoöl. 28: 459–467. *1 fig.* July 5, 1919.—See Bot. Absts. 3, Entry 1499.

653. Morgan, T. H., and Calvin B. Bridges. The inheritance of a fluctuating character. Jour. Gen. Physiol. 1: 639–643. *2 fig.* July 20, 1919.—See Bot. Absts. 3, Entry 1016.

654. Murray, J. G. **Relation of the supplying ovary to the causation of sex.** Johns Hopkins Hosp. Bull. 29: 275–278. 1918.—This paper is a criticism of the theory advanced by E. Rumley Dawson (The causation of sex in man) "that a male foetus is due to fertilization of an ovum that came from the right ovary, and a female foetus is due to the fertilization of an ovum that came from the left ovary." In criticizing the examples given by Dawson in proof of his theory, Murray shows that only four of them fulfill the conditions necessary to make them convincing. Murray then tests from the 17,500 deliveries at the Johns Hopkins Hospital the 75 cases in which it is possible to determine absolutely from which ovary the ovum came, and he finds that male and female children result in about equal numbers from the fertilization of ova from each ovary. He then tests in 40 cases of repeated pregnancies Dawson's rules for predicting the sex of an unborn child and finds that they work in exactly 50 per cent of the cases, which is, of course, the number that would be expected by chance. Murray therefore concludes that the supplying ovary has no influence upon the sex of the child.—*Sylvia L. Parker.*

655. Norton, J. B. **Washington asparagus: information and suggestions for growers of new pedigreed rust-resistant strains.** U. S. Dept. Agric. Bur. Plant Ind. Cotton, Truck, and Forage Crop Diseases Circ. 7. *8 p.* Feb. 15, 1919.—During the past thirteen years there have been developed, through the coöperative efforts of the Massachusetts Agric. Exp. Sta. and the U. S. Bur. Plant Ind., high-yielding pedigreed strains of *Asparagus* resistant to rust, *Puccinia asparagi* De C. Of these the most satisfactory and widely distributed strains are "Mary Washington," "Martha Washington," "Washington Stock," and "Martha Washington Stock." This circular gives briefly the origin and main descriptive characters of each, together with advice to growers as to methods of cultivation, marking, further selection and breeding of these strains. Bur. Plant Ind. does not distribute seeds or roots of these strains but will furnish names of reliable growers from whom they may be obtained.—*Maude Muller.*

656. Norton, J. B. S., and C. E. Leathers. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull. 216. *p. 175–226.* 1918.—Authors discuss factors detrimental to development of seeds and reviews much of previous work on question. Rules for raising good seed are given and troubles of each crop, and control methods, are taken up specifically. Extensive bibliography is included.—Results of original investigations and observations are given as follows:—Variation in infection with septoria on tomato seedlings gives promise for selection in leaf-blight resistance. Seed from green tomatoes will germinate but the greener the seed the longer before germination. Seeds from tomatoes immature when leaves were killed by frost October 14, germinated well when taken from field up to November 9. They withstood a number of heavy frosts and temperatures as low as 15° F. Seeds from tomatoes ripened and rotted in field gave lower percentage of germination than when ripening and rotting process took place in laboratory. Viability of tomato seeds was not affected by 5-days' fermentation in pulp but more than this caused decrease in vitality. Blackening of seeds dried on copper wire did not affect vitality. Some lots of cabbage seeds treated with corrosive sublimate and formaldehyde for disinfection, developed growth of fungi which interfered with growth of seedling when germinated in sterile tubes on synthetic agar. Seedlings without fungus grew freely. Cabbage seeds were injured by water at 52°C. for 20 minutes. In process of disinfection with hot water, 4-year-old seeds were injured at lower temperatures than 2-year. Fresh, half-grown cowpeas will germinate but resulting seedlings are slender and slow-growing. In open fields lightly infested with winter cress, largest and earliest-blooming plants were in center of area occupied by mother plant previous year. Authors believe larger seeds fall nearest mother plant. [See Bot. Absts. 1, Entries 628, 747; 2, Entry 730; 3, Entry 276.]—*Fred Griffee.*

657. Page, E. Judson. **Variability in plants.** Gard. Chron. 66: 10. July 5, 1919.—See Bot. Absts. 3, Entry 1022.

658. Plate, L. Vererbungsstudien an Mäusen. [Inheritance studies on mice.] Arch Entwicklungsmech. Org. 44: 291–336. *5 fig.* 1918.—Author presents results of studies on sable and piebald patterns in mice. He concludes that the sable pattern is due to a mutation of the factor for yellow. He finds that sables, like yellows, are always heterozygous, that they often change into yellows in the course of their life and that they frequently produce or are produced by yellows. He considers that the yellows in these cases really possess the factor for sable but that the production of black pigment is inhibited by independent modifiers. He finds that heterozygous chocolate and pink eyes have modifying influences of this kind. The agouti factor is represented as independent of the black-yellow-sable series (y, Y, Y'). He finds that white spotting is recessive to self-color in agreement with other work, but that the progeny of two piebald mice may have either more or less white than either parent. He believes that his results can be explained by means of multiple factors without assuming either factor inconstancy or contamination.—*Sewall Wright.*

659. Plough, Harold H. Linear arrangement of genes and double crossing over. Proc. Nation. Acad. Sci. [U. S. A.] 5: 167–168. May, 1919.—Plough has demonstrated that crossing over varies with temperature and probably with other environmental factors. Bridges had shown that crossing over varies with age. These influences, very marked for short regions, gradually vanish as distance increases. This must mean that double crossing over is increased proportionally more than single crossing over—which can actually be demonstrated if intermediate points are followed, but remains undetected if they are not. On theory of linear linkage, double crossing over is not, as Castle claims, "unproved hypothesis," but absolutely required by evidence. Castle's theory would necessitate assumption that long chromosomal "distances" are less affected by environment than short ones.—*Alexander Weinstein.*

660. Rabaud, Étienne. Évolution et sexualité. [Evolution and sexuality.] Scientia 25: 275–287. 1919.—Problem of sexuality is physico-chemical, not morphological. Sex and sexual reproduction may be influenced by external factors, or by internal features such as chromosomes; action is physiological in either case. Hermaphroditism implies sexuality, may be more recent than separation of sexes, and requires no special explanation. Regarding utility of sexual reproduction, author rejects rejuvenscence theory, including production of favorable recombinations (Jennings). Sees no connection between parasitic or sedentary modes of life and sexuality. Evolution occurred before sexuality existed, hence evolution by recombination can not be any great advantage. Sexuality arose as result of exchanges between living matter and external influences. Species thus becoming sexual continued to live, not because sexuality brought them any advantage, but because it did them no harm. Or, if some species were thereby injured, they perished.—*A. Franklin Shull.*

661. Reed, H. S. Growth and variability in Helianthus. Amer. Jour. Bot. 6: 252–271. *3 fig.* June, 1919.—See Bot. Absts. 3, Entries 1028, 1029.

662. Sage, E. Judson. Variability in plants. Gard. Chron. 65: 308. June 21, 1919.—See Bot. Absts. 3, Entry 1023.

663. Schacke, Martha A. A chromosome difference between the sexes of Sphaerocarpostexas. Science 49: 218–219. Feb. 28, 1919.—See Bot. Absts. 3, Entry 1034.

664. Schmidt, Johs. Racial studies in fishes. II. Experimental investigations with Lebistes reticulatus (Peters) Regan. Jour. Genetics 8: 147–153. *1 graph.* June, 1919.—See Bot. Absts. 3, Entry 2191.

665. Snyder, H. Wheat breeding ideals. Jour. Amer. Soc. Agron. 10: 113–119. 1918.—See Bot. Absts. 3, Entry 2199.

666. Sturtevant, A. H., C. B. Bridges, and T. H. Morgan. The spatial relations of genes. Proc. Nation. Acad. Sci. [U. S. A.] 5: 168–173. May, 1919.—In Castle's three-dimensional diagram [see Bot. Absts. 2, Entry 658] only a few loci lie outside a single plane. These excep-

tions are due in part to Castle's use of data that are not significant because of the small number of individuals involved, or because particular characters were sometimes not distinguishable, etc. In part also they are due to his use of data derived from different experiments and hence not safely comparable, where the result turns on very small differences, because of the variation of crossing over values due to genetic differences, environment, age, and differential viability.—Where data are derived from same experiment (i.e., where genes are all followed in the same individuals) arrangement of loci is always in a straight line provided that distances involved are short enough to allow no double crossing over. Since entire X chromosome of *Drosophila* can be mapped by combining overlapping segments which are themselves straight lines, arrangement of loci is necessarily represented by a single straight line.—In Castle's diagrams the genes which are located on the basis of sufficient data are all arranged approximately in a line—only the line (if he had drawn it) would be curved. This curvature is due merely to existence of double crossing over. Apparent distance between widely separated loci is less than distance obtained by summating the intermediate segments, because double crossing over is not detected when only two loci are followed. Where double crossing over is followed, the total distance is always sum of component distances; i.e., arrangement is a straight line.—Occurrence of double crossing over between widely separated loci explains why observed crossover values have not exceeded 50 per cent.—Castle is unwilling to admit existence of double crossing over; but his attempt to explain small size of smallest classes by single break fails, because combinations of characters impossible on Castle's scheme have already been reported. Castle's own hypothesis to account for double crossing over is inconsistent with his representation of distances as proportional to crossover values. Moreover, even if Castle's scheme had successfully weathered double crossing over, it would fail to deal with triple crossing over, of which many cases have been found.—*Alexander Weinstein.*

667. Tedin, H. **Växtförädling. [Plant improvement.]** Den mindre jordbrukarens handbok XXXVII-XXXVIII. Stockholm, 1919.—Contains information about the theory and importance of genetical science, written for farmers.—*K. V. Ossian Dahlgren.*

668. Thompson, J. Arthur. [French rev. of: Newman, H. H. **The biology of twins (mammals). (Biologie des jumeaux (Mammifères).)** *186 p., 56 fig.* University of Chicago Press: Chicago, 1917.] Scientia 25: 511–513. 1919.

669. Whiting, P. W. **Genetic studies on the Mediterranean flour-moth, Ephestia kühniella Zeller.** Jour. Exp. Zoöl. 28: 413–445. *2 pl., 1 fig.* July 5, 1919.

670. Whitney, David D. **The ineffectiveness of oxygen as a factor in causing male production in Hydatina senta.** Jour. Exp. Zoöl. 28: 469–492. July 5, 1919.—Food of these rotifers was in all cases green flagellate *Chlamydomonas*. All rotifers were reared in mass cultures from which random collections were taken to determine sex ratio. Fewer males were produced in sunlight than in darkness, reversing results of former experiments. Reversal is attributed to fact that in former experiments *Chlamydomonas* was artificially kept active, whereas in present experiments it was allowed to settle on glass and become less available for food. In some experiments oxygen was measured and found to be more abundant in sunlight (2 to 15 cc. per liter) than in darkness (2 to 8 cc. per liter). In other experiments in which oxygen was allowed to dissolve from the air in some cultures but was excluded from others, same proportion of male-producers was obtained in each. General conclusion is that oxygen is not a factor affecting sex. Paper contains brief criticism of methods and conclusions of Shull and of Shull and Ladoff.—*A. Franklin Shull.*

671. Witte, H. **Über weibliche Sterilität beim Timotheegras (Phleum pratense L.) und ihre Erblichkeit. [On female sterility in timothy (Phleum pratense L.) and its inheritance.]** Svensk Bot. Tidsskr. 13^1: 32–42. *2 fig.* 1919.—In a pedigree of an isolated *Phleum pratense* at Svalöf author has found several plants which did not produce any seeds, as the female organs were rudimentary. Exceptionally however a single seed could be found. The normal plants produced in average 4895 ± 260 seeds, and the male ones only 1.7 ± 0.92 seeds per indi-

vidual. The length of spikes and culms was the same in both categories. In all 43 normal and 19 female plants were secured, which indicates a monohybrid segregation (calculated, 46.50 : 15.50). Also in the next generation male individuals were found among the few plants which came to flower.—*K. V. Ossian Dahlgren.*

672. Woods, Frederick Adams. **Portraits of early Americans.** Jour. Heredity 10: 212–222. *Fig. 13–18.* May, 1919.

HORTICULTURE

J. H. Gourley, *Editor*

673. Andas, J. W. **The cultivation of chicory.** Jour. Dept. Agric. Victoria 17: 113–116. *Fig. 2.* 1919.—Method of cultivation practised for chicory (*Cichorium intybus*) are given. The seeds are planted in September and roots dug in March.—*J. J. Skinner.*

674. Andas, J. W. **An economic plant. The Jerusalem artichoke.** [Helianthus tuberosus.] Jour. Dept. Agric. Victoria 17: 246–248. *Fig. 1.* 1919.—The artichoke is suitable to a variety of soils, its cultivation and economic value is discussed, and its composition given.—*J. J. Skinner.*

675. Berry, James B. **Trees, their use and abuse.** Georgia State Coll. Agric. Bull. 162. *19 p., 18 fig.* 1919.

676. Chase, W. W. **Common insects and diseases of the apple.** Georgia State Bd. Entomol. Bull. 54. *51 p., 12 pl., 22 fig.* 1919.—See Bot. Absts. 3, Entry 748.

677. Darrow, George M. **Currants and gooseberries.** U. S. Dept. Agric. Farmers' Bull. 1024. *40 p., 26 fig.* 1919.

678. Farrell, J. **Apple culture in Victoria.** Jour. Dept. Agric. Victoria 17: 145–157. *Pl. 6.* 1919.—See Bot. Absts. 3, Entry 758.

679. Free, Montague. **Effect of low temperatures on greenhouse plants.** Brooklyn Bot. Gard. Rec. 8: 14–17. Jan., 1919.—Gives experience of Brooklyn Botanic Garden conservatories during the unusually severe winter of 1917–1918, accompanied by abnormal shortage of coal.—*C. S. Gager.*

680. Gunderson, A. J. **The pruning of winter-injured peach trees.** Illinois Agric. Exp. Sta. Bull. 218: 383–394. *Fig. 1–13.* 1919.—The extent of winter injury of peach trees and the factors affecting severity of injury are discussed. The experimental work was confined to 3, 4, and 5-year old, winter-injured Elberta peach trees. The trees were pruned with varying degrees of severity and observations were made as to the effect of such pruning on the growth and on the bud formation. Moderate pruning gave best results.—*M. J. Prucha.*

681. Hollingshead, R. S. **Chemical analyses of logan blackberry (loganberry) juices.** U. S. Dept. Agric. Bull. 773. *12 p.* 1919.—"The juices of berries grown in Washington and Oregon differ markedly in composition from those of fruit produced in California. There is also a very large variation in the composition of juices from fruit grown in the various parts of these states. This is probably due to the fact that in the northern section the berries are grown under heavy rainfall, whereas the land in California usually is irrigated. Apparently California juices have a somewhat higher ash content and a lower acid content than the juices from the more northern states. Observations extending over several seasons would, of course, be necessary to confirm this apparent difference."—*Author's summary.*

682. Holmes, Arthur D. **Digestibility of some by-product oils.** U. S. Dept. Agric. Bull. 781. *16 p.* 1919.—"The coefficients of digestibility of the by-product oils (98.4 per cent for apricot-kernel, 98 per cent for cherry-kernel, 98.2 per cent for cantaloupe-seed, 96.6 per cent for peach-kernel, 98.2 per cent for pumpkin-seed, and 95.8 per cent for tomato-seed oil) indicate that these oils are very well assimilated by the [human] body and possess a nutritive value equal to that of other better known edible oils, such as cottonseed, corn, peanut, cocoanut, soybean, and olive ois.l"—*Author's summary.*

683. Hou, I. P. [Chinese.] **[Plant oils in China.]** Khu-Shou [Science, a publication of the Science Society of China] 4: 321–325, 448–459. 1919.—Seventeen different plant oils are briefly discussed as regards chemical composition, physical properties, and uses in China. Descriptions of the plants, as well as their distribution, are included, together with methods of extraction of oils (in some instances).—*D. E. Lee.*

684. Johnson, James. **The influence of heated soils on seed germination and plant growth.** Soil Science 7: 1–103. *Pl. 1–8.* 1919.—See Bot. Absts. 3, Entry 854.

685. McHatton, T. H., and H. W. Harvey. **Peach growing in Georgia.** Georgia State Coll. Agric. Bull. 169. *32 p., 11 fig.* 1919.—History of *Prunus persica* in Georgia with general cultural and handling directions. Commercial varieties recommended, Mayflower, Greensboro, Carman, Waddell, Hiley, Belle, Elberta and Fox.—*T. H. McHatton.*

686. Pickett, B. S. **Some soil treatments for mature apple orchards.** Illinois Agric. Exp. Sta. Circ. 233. *6 p., 3 fig.* 1919.—The cultivation, mulching, and fertilizing the soil in old apple tree orchards are discussed and the benefits therefrom emphasized.—*M. J. Prucha.*

687. Prescott, Edward E. **The Australian flora from an ornamental aspect.** Jour. Dept. Agric. Victoria 17: 183–187, 242–245. *Pl. 3.* 1919.—A description of the ornamental plants of Australia is given.—*J. J. Skinner.*

688. Wallis, E. **Pear growing in Victoria.** Jour. Dept. Agric. Victoria 17: 76–86, 207–216. *Pl. 16.* 1919.—See Bot. Absts. 3, Entry 869.

689. Zee, T. N. [Chinese.] **[Some ancient works on agriculture.]** Khu-Shou [Science, a publication of the Science Society of China] 4: 269–273. 1918.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

690. Campbell, Douglas Houghton. **Mosses and ferns.** 3d ed. *8vo, 708 p.* Macmillan Co.: New York, 1918.—New edition revised and brought up to date, includes investigations based on collections of tropical liverworts and ferns, especially from the Indo-Malayan region. A large appendix, taking into account the more recent investigations in the field covered by the book, has also been added.—*E. W. Sinnott.*

691. Engler, Arnold. **Tropismen und excentrisches Dickenwachstum der Bäume. Ein Beitrag zur Physiologie und Morphologie der Holzgewächse. [Tropisms and eccentric thickening in trees. A contribution to the physiology and morphology of woody plants.]** Preisschr. Stiftung Schnyder von Wartensee 21: 1–106. *14 pl., 16 fig.* Beer and Co.: Zürich, 1918.—Detailed field notes and stem analyses bearing upon the general form and eccentricity of trees growing on steep slopes and in other abnormal positions, with special reference to heliotropism, geotropism, and the effects of longitudinal compression upon the cambium. The author concludes that there is very little difference between the structure of the so-called

"compression wood" and normal wood of dicotyledons. The geotropically produced wood of ring-porous dicotyledons, on the other hand, is characterized by possessing relatively more "latewood" and wider vessels than normal tissue. The structural changes which occur during geotropic and heliotropic bending are briefly discussed. [See Bot. Absts. 3, Entry 826.] —*I. W. Bailey.*

692. Garber, R. J., and P. J. Olsen. **A study of the relation of some morphological characters to lodging in cereals.** Jour. Amer. Soc. Agron. 2: 173–187. *Fig. 1–2.* 1919.—See Bot. Absts. 3, Entry 468.

693. Parrott, P. J., H. E. Hodgkiss, and F. Z. Hartzell. **The rosy aphis in relation to abnormal apple structures.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 66. *29 p., 8 pl. (2 colored), 6 fig.* 1919.—See Bot. Absts. 3, Entry 783.

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

694. Bristol, B. Muriel. **On the retention of vitality by algae from old stored soils.** New Phytol. 18: 92–107. *Fig. 1–2.* 1919.—Fifteen samples of soil from the experimental plots at Rothamsted (England), which had been sealed at various times from 1846 to 1893, were examined for living algae. A culture fluid was inoculated with the soils in 1916. After a short time green algae developed, and later blue green. The identification of species was rendered difficult by the fact that most of the forms appearing in cultures were not exactly identical with known species. Notes of each species mentioned record these variations from the type. In the following list of species, the numbers following each name indicate (1) the number of samples from which it was recovered, and (2) the number of years it lived in dry soil. *Nostoc muscorum* Kütz. (7–70), *N. Passerinianum* Bornet et Thuret (1–59), N. sp. (3–59), *Anabaena laxa* (Rabenh.) A. Br. (?) (2–46), *A. oscillarioides* Bory forma (4–59), *Nodularia Harveyana* (Thwaites) Thuret (1–70), *Cylindrospermum licheniforme* (Bory) Kütz. (2–59), *Plectonema Battersii* Gomont (4–47), *Hapalosiphon flexuosus* Borzi forma (?) (4–47), *Phormidium tenue* (Menegh.) Gomont (1–47), *Trochiscia aspera* (Reinsch) Hansg. (4–48), *Chlorococcum humicola* (Naeg.) Rabenh. (11–59), *Stichococcus bacillaris* Naeg. (3–48), *Nitzschia Palea* (Ktz.) W. Sm. (1–48).—A new variety (*terrestris*), with two new forms (*major* and *minor*) of *Anabaena oscillarioides* Bory is described.—The degree of dryness of the stored soil appears to affect the longevity in some cases.—*I. F. Lewis.*

695. Carter, Nellie. **Trachelomonas inconstans, a new flagellate.** New Phytol. 18: 118–119. *Fig. 1.* 1919.

696. Groves, James. **Notes on Lychnothamnus.** Jour. of Bot. 57: 125–129. 1919.—The author discusses a charophyte raised from mud collected in Cape Colony, and concludes that it is *L. macropogon*, Braun, an Australian species, heretofore not known from Africa. The status of the generic name *Lychnothamnus* is discussed, it being shown that *L. macropogon*, a somewhat transitional species, may be treated in one of four ways: it may remain in *Lychnothamnus*, be placed in *Lamprothamnium*, be separated in a genus *Macropogon* or be reinstated in *Chara*. The author, after discussion, prefers the last alternative. Incidentally the new combination *Nitellopsis obtusa* (Desv.) is made for *Lychnothamnus stelliger* Braun.—*K. M. Wiegand.*

697. Hauman, L. **Notes floristiques. Quelques cryptogames, gymnospermes et monocotilédones de l'Argentine. [Floristic notes. Some Argentine cryptogams, gymnosperms and monocotyledons.]** An. Mus. Nacion. Hist. Nat. Buenos Aires 29: 391–444. *Pl. 1–4, fig. 1–3.* 1917.

698. Smith, Gilbert Morgan. **A second list of algae found in Wisconsin lakes.** Trans. Wisconsin Acad. Sci. 19: 614–653. *Pl. 10–15.* 1918.—The present paper is a continuation of the author's studies on Wisconsin algae (see Smith, G. M. **A preliminary list of algae found in Wisconsin lakes.** Trans. Wisconsin Acad. Sci. 18: 531–565. 1916) but is confined almost exclusively to the plankton forms.—*Planktosphaeria* is proposed as a new genus in the family Palmellaceae, with *P. gelatinosa* as the only species.—The following new species are described: *Asterococcus limneticus, Oocystis eremosphaeria, Tetraedron verrucosum, Characium curvatum,* and *Chlorbotrys limneticus.*—New varieties are proposed, as follows: *Chroococcus limneticus* var. *elegans, Westella botryoides* var. *major, Oocystis natans* var. *major, Micractinium pusillum* var. *elegans, Actinastrum hantzschi* var. *elongatum, Scenedesmus arcuatus* var. *capitatus, Sorastrum americanum* var. *undulatum,* and *Botryococcus protruberans* var. *minor.*—The following new combinations appear: *Quadrigula pfitzeri* (*Ankistrodesmus pfitzeri Schröder*), *Kirchneriella obesa* var. *major* (*Kirchneriella major* Bernard).—Critical notes are given for *Phaeococcus planctonicus, Dactylococcopsis acicularis, Trichodesmium lacustre, Aphanizomenon flos-aquae, Gonium pectorale, Tetraedron proteiforme, Polyedriopsis spinulosa, Closteriopsis longissima* var. *tropica, Kirchneriella elongata, Actinastrum hantzschi, Crucigenia irregularis, C. lauterbornei, Sorastrum americanum, Characium limneticum, Closterium aciculare* var. *subpronum,* and *Botryococcus braunii.* The description of *Gloeocystopsis limneticus* is amended. Critical notes on the genera *Asterococcus* and *Pediastrum* are included. —*J. R. Schramm.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

699. Andrews, A. LeRoy. **Bryological notes—V. Scapania nimbosa from Norway.** Torreya 19: 49–51. 1919.—This hepatic, previously known only from a few stations on the western coasts of the British Isles, was collected by the writer in 1907 in the Tverfjeldene (limestone) region of western Norway.—*J. C. Nelson.*

700. Claassen, Edo. **Mosses of several Ohio counties.** Ohio Jour. Sci. 19: 362–366. 1919.—A list is given of the moss flora of northern Ohio. It includes 5 Sphagnaceae, 72 Acrocarpi and 79 Pleurocarpi.—*H. D. Hooker, Jr.*

701. Dixon, H. N. **Miscellanea bryologica—VI.** Jour. Botany 57: 73–80. 1919.—*Chaetomitrium Deplanchei* (Besch.) Duby and its allies are first considered, *C. Geheebii* Broth. and *C. tahitense* (Sull.) Mitt. being studied in detail, with critical notes on material from the New Hebrides, New Caledonia and other localities. The conclusions are reached that *C. Geheebii* is a synonym of *C. Deplanchei* and that *C. tahitense* should be considered merely a variety of the latter species, the new combination *C. Deplanchei* var. *tahitense* (Sull.) Dixon being made. Critical studies and notes are then given on the following species: *Gymnostomum oranicum* Rehm. of South Africa, which is definitely referred to the genus *Weisia* under the name *W. oranica* Rehm.; *Anoectangium scabrum* Broth. of German East Africa, which is made a synonym of *A. pusillum* Mitt.; *Taxithelium Gottscheanum* (Hampe) Broth. of the Philippine Islands; *Hypnum scabrellum* Lac. of the East Indies, which is made a synonym of *Sematophyllum lamprophyllum* Mitt.; *S. decipiens* Dixon, a new species from Borneo; *Bryum Beschercllei* Jaeg. of New Zealand, which is made a synonym of *B. erythrocarpoides* Hampe & C. M.; and *Barbella Levieri* (Ren. & Card.) Fleisch. of eastern Asia. A few corrected determinations from an earlier paper on Ceylonese mosses are likewise included.—*K. M. Wiegand.*

702. Evans, Alexander W. **Hepaticae of St. Croix, St. Jan, St. Thomas and Tortola.** In: N. L. Britton. **The flora of the American Virgin Islands.** Mem. Brooklyn Bot. Gard. 1: 104–109. 1918.—After a short historical introduction 21 species from the islands in question are listed. These include 13 *Lejeuneae*, 3 *Frullaniae*, and 1 representative of each of the following genera: *Riccia, Plagiochila, Radula, Notothylas,* and *Anthoceros.* No new species or combinations are proposed. [See Bot. Absts. 1, Entry 1077.]—*A. W. Evans.*

703. Evans, Alexander W. **A taxonomic study of Dumortiera.** Bull. Torrey Bot. Club 46: 167–182. 1919.—A history of the genus *Dumortiera* is given with an account of the scope of the genus and its treatment by other workers. Many of the species are based on unsatisfactory characters; a discussion of the merit of the following is given: branching of the thallus, structure of the thallus, receptacles, and spores. Of the 10 species that have been referred to the genus, 3 belong to other genera; using the structural features of the thallus as a basis the writer recognizes at present only 2 species, *D. hirsuta* (Sw.) Nees and *D. nepalensis* (Tayl.) Nees, both of which are widely distributed.—*P. A. Munz.*

704. Hurst, C. P. **Ilfracombe mosses and hepatics.** Jour. Botany 57: 91–97, 119–124. 1919.—The report is based on collections made in 1917 around Ilfracombe and on Braunton Burrows, North Devonshire, England. Lists of mosses and hepatics, with notes and discussions, are given.—*K. M. Wiegand.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. Olive, *Editor*

705. Anderson, P. J. **Index to American species of Phyllosticta.** Mycologia 11: 66–79. 1919.—This index is designed to supplement "The North American Phyllostictas" by Ellis and Everhart. Forty-one new species, 20 species reported for the first time, 116 new hosts, and transfers which have appeared since the publication of Ellis and Everhart's monograph are included. Citation of literature is given under each species and a host index presented which includes all species on which Phyllostictas have been reported. No attempt is made to trace synonomy.—*H. R. Rosen.*

706. Atanasoff, D. **A novel method of ascospore discharge.** Mycologia 11: 125–128. *Fig. 1–3.* 1919.—In certain *Pyrenophora* species and in *Pleospora herbarum* (Pers.) Rab. which have asci whose walls are composed of two layers, the outer layer, during the process of spore liberation, ruptures and contracts at a point about one third of the distance up from the base of the ascus, thus forming a ring. The inner wall in turn ruptures immediately above the ring and the spores are set free at this point.—*H. R. Rosen.*

707. Beardslee, H. C. **Michigan collections of Myxomycetes.** Rept. Michigan Acad. Sci. 19 (1917): 159–162. 1919. A list of Myxomycetes collected in Montmorency County, Michigan, during August of two summers. *Physarum diderma* Rost. and *P. leucopus* Link are reported as of special interest because of their rarity. Fifty-five species are reported.—*G. H. Coons.*

708. Bengston, Ida A. **The proteus group of organisms with special references to agglutination and fermentation reactions to classification.** Jour. Infect. Diseases 24: 428–481. 1919.

709. Bessey, Ernst A. **An undescribed species of Ophiodothella on Ficus.** Mycologia 11: 55–57. *Pl. 5.* 1919.—*O. Fici* sp. nov. is described as producing a leaf spot on *Ficusaurea* in Florida. The fungus belongs near the genus *Ophiodothella* as limited by Theissen and Sydow, differing in the presence of paraphyses and in the possession of a pycinidial stage which is unlike any described for species of this genus.—*H. R. Rosen.*

710. Dietel, P. **Über die wirtswechselnden Rostpilze.** [Concerning the heteroecious rusts.] Centralbl. Bakt. II, 48: 470–500. 1918.—The author has summarized, without bibliographical citations, the heteroecious rusts, so far as they were known up to the beginning of 1917, giving in convenient tabular form the rust, the aecidial and teleutosporic hosts. He thus enumerates 264 species of heteroecious rusts, as against Klebahn's 137. In another table, in parallel columns, certain heteroecious species are compared with parallel short-cycled micro- or lepto-forms, which occur on the same aecial host. The author concludes with a theoretical discussion of the origin of heteroecism.—*E. W. Olive.*

711. Doncaster, L. **Note on an experiment dealing with mutation in bacteria.** Proc. Cambridge Phil. Soc. 19: 269. 1919.

712. Elliott, John A. **A smut on Iresine.** Mycologia 11: 87–88. *Fig. 1–4.* 1919.—*Tolyposporium iresine* sp. nov. is described as attacking the flowers of *Iresine paniculata* from Indiana.—*H. R. Rosen.*

713. Fischer, E. **Neueres über die Rostkrankheiten der forstlich wichtigsten nadelhölzer der Schweiz. [Recent information about important rusts of conifers of Switzerland.]** Schweiz. Zeitschr. Forstw. 49: 113–120. 1918.—Review of recent European advances in knowledge, without bibliographical citations, of the following: *Cronartium asclepiadeum, Peridermium pini* and *Cronartium ribicola* on *Pinus; Melampsorella caryophyllacearum, Calyptospora goeppertiana, Puccinastrum circaeac, Melampsora abieti-caprearum* on white fir (*Abies*); *Chrysomyxa rhododendri, C. ledi, Thecopsora sparsa, Aecidium strobilinum, Ae. conorum-piceae* on *Picea*; 4 species of *Melampsora* having aecia on *Larix* and telia on certain species of *Salix.—D. Reddick.*

714. Fraser, W. P. **Cultures of heteroecious rusts in 1918.** Mycologia 11: 129–133. 1919.—By using fresh aeciospores obtained from rusted plants of *Ranunculus Macounii* successful infections, with the production of uredinia and telia of *Uromyces Alopecuri* Seym., were obtained on *Alopecurus aristulatus* while *Agropyron tenerum* and *Hordeum jubatum* failed to show infection. Aecia of *Puccinia augustata* Peck were produced on *Mentha canadensis* by using telia from *Scirpus atrovirens.* Successful infections of *Puccinia Impatientis* (Schw.) Arth. were obtained on *Hordeum jubatum* by using aeciospores from *Impatiens biflora.* Uredinia and in most cases telia of *Puccinia Agropyri* E. and E. were produced on *Elymus canadensis, E. virginicus, Hordeum jubatum* and *Bromus ciliatus* by using aeciospores from *Thalictrum dasycarpum.* Urediniospores from *Bromus* failed to infect *Elymus virginicus, Agropyron Smithii, A. tenerum, A. repens* and *Hordeum jubatum* suggesting the possibility of two kinds or strains of aecia on *Thalictrum.—H. R. Rosen.*

715. G[ager], C. S. **The Ames bequest.** Brooklyn Bot. Gard. Rec. 7: 23–24. Jan., 1918.—The fungus herbarium (517 specimens) and library of the late Frank H. Ames bequeathed to Brooklyn Botanic Garden.—*C. S. Gager.*

716. Gäuman, E. **Über die Spezialisation der Peronospora calotheca DeBary. [Specialization of P. calotheca.]** Svensk Bot. Tidsskr. 12: 433–445. *2 fig.* 1918.—See Bot. Abst. 3, Entry 765.

717. Gäuman, E. **Über die Spezialisation der Peronospora auf einigen Scrophulariaceen. [Specialization of Peronospora on Scrophulariaceae.]** Ann. Mycolog. 16: 189–199. *6 fig.* 1918. —See Bot. Abst. 3, Entry 766.

718. Güssow, H. T. **The Canadian tuckahoe.** Mycologia 11: 104–110. *Pl. 7–9.* 1919. —Black sclerotia are found in Canada whose habitat is among the roots of poplar woods. They range from the size of a hen's egg to that of a cocoanut, bouncing like a solid rubber ball when fresh. The bark seems structureless and sand and stones are frequently found imbedded within the interior which is blackish olive-green mottled with dirty-white crevices. A sclerotium which was planted outdoors produced a fruiting body in 10 months. *Grifola Tuckahoe* sp. nov., a stiped polypore, is the name given to this body.—*H. R. Rosen.*

719. Hawk, Philip B., Hamilton R. Fishback, and Olaf Bergeim. **Compressed yeast as food for the growing organism.** Amer. Jour. Physiol. 48: 211–220. 1919.—See Bot. Absts. 3, Entry 806.

720. Hawk, Philip B., Clarence A. Smith, and Ralph C. Holder. **Baker's yeast as food for man.** Amer. Jour. Physiol. 438: 199–210. 1919.—See Bot. Absts. 3, Entry 807.

721. Hoehnel, Franz v. Fungi Imperfecti. Beitrage zur Kenntnis derselben. [Studies on imperfect fungi.] Hedwigia 60: 129–176. 1918. [Continued from Hedwigia 59.] —The author gives the results of his examination of the following Fungi—usually with full descriptions:—(36) *Phoma occulta* Desm. = *Sclerophomella occulata* (Desm.) Hoehn.; *Sphaeria leptidea* Fr. the author does not accept the genus *Myxothyrium* Kabat & Bubak proposed for this fungus. He thinks that the ascogenous form is, as yet, unknown. (37) *Chaetopyrena hesperidum* Pass. Not *Chaetopyrena* Sacc. Syll. Fung. 2: 184. *Sclerochaeta* Hoehn. = *Chaetopyrena* Pass. For *Phoma penicillatum* Fckl. *Chaetopyrena penicillatum* (Fckl.) Hoehn. is proposed. It is probably a pycnidial state of *Pyrenophora.* (38) *Pyrenochaetina obtegens* Syd. A conidial state of *Parodiella.* (39) *Sphaeria miribelii* Fr. = *Sarcophoma miribelii* (Fr.) Hoehn. Gives synonymy. (40) *Phoma nitidum* Rob. = *Sclerophoma nitida* (Rob.) Hoehn. (41) *Sphaeria aliena* Fr. = *Sphaeria foveolaris* Fr. which is *Sclerophoma foveolaris* (Fr.) Hoehn. Gives synonymy. (42) *Phoma punctiformis* Desm. = *Sclerophoma punctiformis* (Desm.) Hoehn. (43) *Bakerophoma sacchari* Died, *insect* work. To be stricken out. (44) Species of *Phyllosticta* on rose leaves. (1) *Phyllosticta rosae* Rob. An immature Pyrenomycetis. To be stricken out. (2) *Phyllosticta rosarum* Pass. Probably founded on spermogonia of *Phragmidium* and hence to be stricken out. (3) *Phyllosticta rosicola* Massal. Is a *Stictochorella* Hoehn. and probably connected with *Sphaerella rhodophila* Pass. (45) *Phoma exigua Desm.* To be stricken out. (46) *Hendersonia* (*Piestospora*) *smilacina* Desm. = *Cylindrophoma smilacina* (Desm.) Hoehn. (47) *Plenozythia euphorbiae* Syd. Is not a *Nectrioidacea* but rather a *Macrophoma.* (48) *Sphaeria leguminis-cytisi* Desm. = *Diplodina leguminis-cytisi* (Desm.) Hoehn. The probable ascigerous stage, *Sphaerella leguminis-cytisi* Ces. & DeNot. becomes *Didymella leguminis-cytisi* Hoehn. (49) *Botryella nitidula* Syd. Is a Darluca parasitic in the sori of a Puccinia. The parasitized rust is considered to be a new species for which the name *Puccinia aculeatispora* is proposed. No description is given of the spores of the rust of which but few were seen. (50) *Sphaeria perforans* Rob. = *Tiarospora perforans* (Rob.) Hoehn. The synonymy is given. (51) *Haplosporella longipes* Ell. & Barth. Is probably a form of *Sphaeropsis mori* Berl. (52) *Pleosphaeropsis dalbergiae* Died. Appears to be referable to *Sphaeropsis* as also does the genus *Cytosphaera* Died. (53) *Aposphaeriopsis pini-sylvestris* (Ferraris) Hoehn. This is *Coniothyrium olivaceum* Bon. var. *pini-sylvestris* Ferraris raised to specific rank. .*Coniothyrium cedri* Rolland is probably identical. (54) The genus *Haplosporella* Speg. The type, *H. chlorostroma* Speg. is *Camarosporium robiniae* (West.) Sacc. from which *C. fenestratum* (B. & C.) Sacc. and *C. pseudoacaciae* Brun. are not specifically distinct. *H. brunaudiana* Pass. is overmature *Anthostomella scopariae* H. Fabre. In the type specimen *Eriospora biparasitica* Hoehn. n. sp. is parasitica. *Haplosporella caespitosa* (B. & Br.) Sacc. does not belong in this genus. It is probably a pycnidial form of *Cucurbitaria hederae* Wint. "*H. caespitosa*" in Roum. *F. gall exs.* 5778 is a form of *Coniothyrium hederae* (Desm.) Sacc. mislabeled. *H. dothidioides* Sacc. is over-mature *Phaeochora chamaeropsis* (Cke.) Hoehn. *H. minor* Ell. & Barth. = *Sclerothyrium minor* (E. & B.) Hoehn. *Haplosporella missouriensis* is probably a *Cytoplea. H. rhamni* Died. = *Sclerothyrium rhamni* (Died.) Hoehn. *H. dendritica* Raciborski is probably a *Lasmenia.* To *Haplosporella* have been referred very different and unrelated forms. For those with distinct conidiophores *Microsporella* n. gen. is proposed with *M. pityophila* Hoehn. as the type. It is perhaps a pycnidial state of *Cucurbitaria pityophila* (K. & S.) de Not. (55) *Stenocarpella zeae* Syd. Is probably a form of *Diplodia zeae* (Schw.) Lev. together with *Diplodia macrospora* Earle and *D. maydicola* Speg. (56) Species of *Septoria* on *Convolvulus. Septoria convolvuli* is a true *Septoria* of which *S. flagellaris* E. & E. and *S. fabletiana* Speg. are probably forms. *S. convolvuli* Desm. var. *soldanellae* Brun. is raised to specific rank with some doubt. *Septoria calystegiae* West. is referred to *Hendersonia* Berk. (non Sacc. = *Stagonospora* Sacc.) as *H. calystegiae* (West.) Hoehn. with *Polystigma pertusarioides* Desm. *Septoria sepium* Desm., *S. convolvulina* Speg. *A. obtusispora* Oud. and *S. longispora* Bondarzew as synonyms. (57) *Taeniophora acerina* Karst. *Phragmotrichum acerinum* Fr. Pycnidial state of (–) *Cucurbitaria acerina.* (58) The genus *Sphaeronemella* Karst. Proposes *Hyalopycnism.* gen. with *Sphaeria vitrea* Cda. as type. (59) *Mycorhynchella* n. gen. (*Nectrioideae*). 3 species including *Sphaeronema betae* Hollrung. (60) *Phoma acervalis* Sacc. Referred to *Cyanophomella* Hoehn.

n. gen. (61) *Botryogene visci* Syd. = *Stagonstroma visci* (Syd.) Hoehn. (62) Genus *Chaetostroma*. Species referred to *Amerosporium* Speg. (63) *Chaetodiscula hysteriformis* Bubak & Kabat. = *Myxormia typhae* (Fckl.) Hoehn. *Chaetodiscula* Bub. & Kab. = *Hymenopsis* Sacc. = *Godroniella* Karst. = *Myxormia* B. & Br. (64) *Pseudolachnea* Ranojevic = *Dinemasporiopsis* Bub. & Kab. which should be included in *Dinemasporium* Lev. More or less indistinctly septate conidia occur. (65) *Bactrexcipula strasseri* n. gen. & sp. on a fir needle. (66) *Psalidosperma mirabile* Syd. = *Ypsilonia cuspidata* Lev. (67) *Hainesia* Ell. & Sacc. Characters of the genus emended and species discussed. (68) *Phyllosticta destructiva* Desm. var. *a. malvarum* = *Ascochyta destructiva* (Desm.) Hoehn. var. b. *lycii* = *Ascochyta lycii* (Desm.) var. c *evonymi* = *Stictopatella* (n. gen.) *evonymi* (Desm.) Hoehn. var. d. *hederae* is a *Phyllosticta*. Perhaps *Ph. hedericola* D. & M. (69) *Apiosporium fumago* Fckl. In part = *Diplopeltis fumago* Hoehn. (70) *Peltaster Hedyotidis* Syd. A good form genus. (71) *Asteromella* Pass. & Thuem. emend. Hoehn. Pycnidia maculicolous, internal, small, with parenchymatous-membranaceous walls; conidia hyaline, small, bacillary; conidiophores short, simple (?); conidia apical, not catenulate; ostiole roundish. Segregated from *Phyllosticta* Pers. (72) *Sacidium alpestre* Ces. = *Leptothyrium alpestre* (Ces.) Hoehn. (73) Conidia of *Euryachora betulina* (Fr.) Schroet. *Didymochora* (n. gen.) *betulina* Hoehn. Leptostromaceae. (74) The genus *Dothiorella* Sacc. An aggregate genus in which have been placed species referable to *Pleurophomella* Hoehn., *Dothiorina* Hoehn., *Ceuthospora*, *Doihichiza* Lib. non Sacc. *Leptodothiorella* n. gen. etc. *Dothiorella* proper is defined and numerous species critically treated. *Aposphaerina episphaeria* n. gen. & sp. proposed. The section is not finished in this number. —*J. J. Davis.*

722. Kauffman, C. H. **Unreported Michigan fungi for 1915 and 1916, with an index to the hosts and substrata of Basidiomycetes.** Rept. Michigan Acad. Sci. 19 (1917): 145–157. 1919.—Continuing the listing of fungi in the Cryptogamic Herbarium of the University of Michigan, the writer lists the Phycomycetes, Ascomycetes and Basidiomycetes, and Fungi Imperfecti as yet unreported. In addition to the lists of fungi, the writer gives an index to the hosts and woody substrata of Hymenomycetes in Michigan.—*G. H. Coons.*

723. Kern, Frank D. **North American rusts on Cyperus and Eleocharis.** Mycologia 11: 134–147. 1919.—Five species of rusts are described on *Cyperus* including *Puccinia Cyperitagetiformis* (P. Henn.) comb. nov. and *P. abrepta* sp. nov. while 4 species are described on *Eleocharis* including *Puccinia liberta* sp. nov. and *Uredo incomposita* sp. nov. A key to the rusts on each host genus, based on urediniospore and teliospore characters, is presented.—*H. R. Rosen.*

724. Klebahn, H. **Peridermium pini (Willd.) Kleb. und seiner Uebertragung von Kiefer zu Kiefer. [P. pini and its passage from pine to pine.]** Flora 111–112: 194–207. *Pl. 4–5.* 1918.—See Bot. Absts. 3, Entry 774.

725. Kopeloff, Nicholas, and Lillian Kopeloff. **The deterioration of cane sugar by fungi.** Louisiana Agric. Exp. Sta. Bull. 166. *72 p., pl. 1–2, fig. 1.* 1919.—See. Bot. Absts. 3, Entry 819.

726. Kopeloff, Nicholas, and Lillian Kopeloff. **Some new phases of the problem of preventing sugar deterioration.** Louisiana Planter and Sugar Manuf. 62: 237–238. 1919. —See Bot. Absts. 3, Entry 820.

727. Levine, Michael. **Further notes on the sporadic appearance of non-edible mushrooms in cultivated mushroom beds.** Mycologia 11: 51–54. *Pl. 4.* 1919.—The author found an undetermined, white agaric, and *Alcuria vesiculosa* and *A. vesiculosa* var. *saccata* in mushroom beds.—*H. R. Rosen.*

728. Murrill, W. A. **Illustrations of fungi.** Mycologia 11: 101–103. *Pl. 6 (colored).* 1919.—The following polypores found around New York City are described and illustrated: *Ganoderma Tsugae* Murrill, *Inonotus dryophilus* (Berk.) Murrill, *Ganoderma sessile* Murrill and *Tyromyces Spraguei* (Berk. & Curt.) Murrill.—*H. R. Rosen.*

729. Palm, Bj. **Sur une Plasmodiophoracée nouvelle Liginera isoëtis.** [A new slime mold.] Svensk Bot. Tidsskr. 12: 228–232. *3 fig.* 1918.—Under the name *Liginera isoëtis*, Palm describes a new species of the genus *Liginera*. This newly discovered member of the Plasmodiophoraceae lives as a parasite within the cells of leaves of *Isoetis lacustris*. Occasionally single spore walls were found in cells at some distance from the main centers of infection. The author thinks this distribution indicates infection by amoebae.—*L. O. Kunkel.*

730. Tanaka, Tyôzaburô. **New Japanese fungi. Notes and translations. VI.** Mycologia 11: 80–86. 1919.—The following fungi are described: *Uncinula curvispora* K. Hara sp. nov. (*U. septata* var. *curvispora* K. Hara var. nov.) on *Fagus sylvatica* var. *Siebaldi*, *U. geniculata Gerard* var. *carpinicola* K. Hara var. nov. on *Carpinus* sp., *U. necator* (Schw.) Burr. var. *Actinidae* K. Hara comb. nov. on *Actinidia polygama* and *A. Kolomikta*, *Microsphaera alni* (Wallr.) Salm. forma *Quercus-glanduliferae* K. Hara forma nov. on *Quercus glandulifera*, *Macrophoma Corchori* Sawada sp. nov. on *Corchorus capsularis*, *Perenospora chenopodii-ficifolii* Sawada sp. nov. on *Chenopodium ficifolium*, *Bremia sonchi* K. Sawada sp. nov. on *Sonchus oleraceus*, *B. saussureae* Sawada sp. nov. on *Hemistepta carthamoides*, *B. ovata* Sawada sp. nov. on *Crepis japonica*, and *Helicobasidium mompa* N. Tanaka forma *macrosporum* K. Hara formi nov. on *Morus*.—*H. R. Rosen.*

731. Tanaka, Tyôzaburô. **New Japanese fungi. Notes and translations—VII.** Mycologia 11: 148–154. 1919.—The following fungi are described: *Didymella Mori* K. Hara sp. nov. on twigs of *Morus alba*, *Mycosphaerella Colocasiae* K. Hara sp. nov. causing a leaf spot of *Colocasia antiquorum*, *Valsa Mali* Miyabe et Yameda ex M. Miura causing a twig disease of apple, *Diaporthe Mali* Miura sp. nov. producing a leaf spot, fruit rot and twig blight of apple. *Phragmidium Rubi-Sieboldii* Kawagoe sp. nov. on leaves of *Rubus Sieboldii*, *Polyporus pubertatis* Yasuda sp. nov. on bark, *Neottiospora Theae* Sawada sp. nov. causing a leaf spot of *Thea sinensis*, and *Pestalozzia gossypii* Hori sp. nov. ex S. Thuruda which produces reddish-brown spots on cotton leaves.—*H. R. Rosen.*

732. Weir, James R. **Concerning the introduction into the United States of extra-limital wood-destroying fungi.** Mycologia 11: 58–65. 1919.—See Bot. Absts. 3, Entry 797.

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

733. Arber, Agnes. **Aquatic angiosperms: The significance of their systematic distribution.** Jour. Botany 57: 83–86. 1919.—Aquatic angiosperms are not primitive, but descendents of terrestrial ancestors. Their floral organs are decidedly terrestrial. A study of the sytematic distribution of aquatic families and species of Angiosperms shows certain general conclusions. Most obvious is the relative paucity of hydrophytes. Families of such are almost negligible. This is to the author not surprising, since the phanerogams are a terrestrial stock. Also, the area of freshwater is much smaller than the land surface. The occurrence of aquatic forms in many different families and genera, with no apparent rule, is noted. Many aquatic members in a family is held to show that the habit is ancient in that family, the differentiation of genera having occurred since the aquatic habit was adopted. The Nymphaeaceae and Podostemaceae are cited as examples. The primitive nature of the Helobieae is noted and the possible relation to the Ranales discussed. The aquatic habit here is ancient though the ancestors were terrestrial. The great diversity in this group is also noted, as suggesting its primitive nature. It is suggested that the primitive Ranalean and Heliobian stock was particularly adapted to aquatic life. It is significant that no Sympetalous family has become entirely aquatic and no species has acquired submerged pollination. In the Compositae there are barely a one-half dozen aquatic members. The same is true of the early cohorts of the Engler tystem, which are now considered to be recent reduced forms. Aquatic habit in the dicots is largely confined to the Polypetalae, and mostly to the Ranales. The Sympetalae may now

be handicapped in adopting an aquatic habit by the high degree of complexity they have acquired; while the more simple Ranales are perhaps more plastic to the aquatic habit. There was also less competition in earlier times than now, before the water was so well populated.—*K. M. Wiegand.*

734. Bertrand, Paul. **Sur la flore du bassin houiller de Lyon (bassin houiller du Bas-Dauphine). [Flora of the Coal basin of Lyon.]** Compt. Rend. Acad. Sci. Paris **168**: 174–177. 1919.—To determine the possible extension of the St. Etienne Coal Basin in the direction of Lyon, deep borings have been made to the east and southeast of that city with the result that a series of bituminous and coal-bearing rocks to the thickness of 700 meters or more were discovered directly overlying the crystalline rocks. This series throughout has yielded determinable plant remains which serve well the purposes of correlation. *Walchia* occurs throughout the entire series, very sparingly at the base but abundantly toward the top, showing that the lowermost units are not older than the transition beds between the Rive-de-Gier and the St. Etienne series. The plant species, of which the author gives a list, are typical of the St. Etienne series and the absence even from the upper beds of the species characteristic of the zone of *Odontopteris minor* Br. shows that the uppermost units are no younger if indeed quite as young as the bituminous beds of Montrambert of the Lower Stephanien.—*H. Bassler.*

735 Garwood, Edmund J., and Edith Goodyear. **On the geology of the Old Radnor District with special reference to an algal development in the Woolhope Limestone.** Quart. Jour. Geol. Soc. London **74**: 1–30. *Pl. I–VII.* 1918.—The Woolhope Limestone of the Old Radnor and Nash-Scar districts of the Welsh Border constitutes a special reef facies of the Wenlock series of the Middle Silurian with by far the most remarkable development of algal limestone yet recorded from the British rocks. This limestone, 80 to 100 feet thick, is unusually pure, $CaCO_3$ exceeding 99 per cent of the whole, calcareous algae, especially Solonopora, in places constituting fully half the rock. The algae occur in the form of irregular nodular growths varying in size from that of a pea to masses 17 centimeters in diameter, appearing on weathered surfaces as conspicuous white spots scattered through the deposit. Two species of algae are discussed in detail and figures on Plate VI. *Spharocodium gothlandicum* Rothpletz and *Solonopora gracilis* sp. nov. (described on page 27). These fossil reefs though strikingly similar, appear to be slightly older than the algal-reef-bearing series of southern Gotland.—*H. Bassler.*

736. Nathorst, A. G. **Ginkgo adiantoides (Unger) Heer in Tertiär Spitzbergens nebst einer Kunzen Uebersicht der übrigen fossilen Ginkgophyten desselben Landes. [G. adiantoides in Spitzbergen Tertiary, etc.]** Geol. Fören. Förhandl. Stockholm **41**: 234–248. *Fig. 1–4.* 1919.—The discovery of this species near the base of the Tertiary, both at Green Harbor and Braganza Bay, Spitzbergen, here announced for the first time, is interesting from the fact that these localities are 8° of latitude farther north than any at which it has been discovered heretofore, though its distribution in the North Temperate Zone is wide. In time it is known to range from the Upper Cretaceous to the Upper Pliocene. In a statement to the brief review of other ginkgoalian plants of Spitzbergen, the author emphasizes that the following must be considered merely preliminary to a critical revision of this group which he hopes to publish as a supplement to his Contributions to the Mesozoic Flora of Spitzbergen. The so-called "Taxodium Shales" (Tertiary) of Kap Staratschin yielded two species of *Torellia Feildenia*] somewhat provisionally assigned to the Ginkgoales. In the "Sandstone Series," [apparently transitional between the Cretaceous and the Jurassic of this region, there are two plant-bearing horizons about 40 meters apart, of which the higher comprises the so-called "Ginkgo beds" and the lower the "Elatides beds." The first-mentioned are the richer in ginkgoalian remains, having already yielded several species each of genera the *Ginkgo* and *Baiera* and at least one each of the genera *Czekanowskia, Phoenicopsis,* and *Eretmophyllum* (?). Two much reduced species of *Baiera* and one of *Torellia* are the only ginkgoalians thus far reported from the Elatides beds. Neither the Rhaetic nor the Triassic of Spitzbergen have yet yielded plants of this group but *Psygmophyllum Williamsoni* Nath. from the Devonian has some superficial characters which suggest affinity. [See Bot. Absts. 3, Entry 1613.]—*H. Bassler.*

PATHOLOGY

Donald Reddick, *Editor*

737. Anderson, P. J. **Index to American species of Phyllosticta.** Mycologia **11**: 66–79. 1919.—See Bot. Absts. 3, Entry 705.

738. Anonymous [B. O. Dodge]. **Index to American mycological literature.** Mycologia **11**: 97–100. 1919.

739. Anonymous [B. O. Dodge]. **Index to American mycological literature.** Mycologia **11**: 158–161. 1919.

740. Anonymous. **Hearing on proposed restrictions on importation of plants.** Brooklyn Bot. Gard. Rec. 7: 93–95. July, 1918.—Refers to public hearing held at Washington, May 28, 1918, on plant quarantine legislation of United States Congress.—*C. S. Gager.*

741. Bennett, C. W. **Soft rot of pepper caused by Bacillus carotovorus.** Rept. Michigan Acad. Sci. **20**: 351–352. *Pl. 28.* 1918.—A description of a soft rot disease observed in 1917 on pepper plants growing in the Horticultural plots of the Michigan Agricultural College. Experiments were made in order to compare the pepper rot organism with *Bacillus carotovorus*, which had been suggested as the causal organism. There was no apparent difference between the rot symptoms produced by the pepper rot organism and those produced by laboratory culture of *Bacillus carotovorus*. As a result of these experiments the writer concludes that the pepper may be listed among the many hosts of *Bacillus carotovorus*.—*J. Norma Anderson.*

742. Berry, James B., and John K. Giles. **The production of corn. Corn Club Guide. Part I. Increased yields as a result of disease control.** Georgia State Coll. Agric. Bull. 165. *16 p., 13 fig.* 1919.—See Bot. Absts. 3, Entry 461.

743. Berry, James B. **Georgia plant diseases. A brief discussion of the diseases of economic crops and recommendations for prevention and control.** Georgia State Coll. Agric. Bull. 168. *57 p.* 1919.

744. Bessey, Ernst A. **An undescribed species of Ophiodothella on Ficus.** Mycologia **11**: 55–57. *Pl. 5.* 1919.—See Bot. Absts. 3, Entry 709.

745. Brandes, Elmer W. **Distribution of Fusarium cubense E. F. S., the cause of banana wilt.** Rept. Michigan Acad. Sci. **20**: 271–275. 1918.—The author gives a report of observations in American banana countries north of the equator. He concludes that the banana wilt organism, *Fusarium cubense*, which he has already shown to be pathogenic (Ann. Porto Rico Agric. Exp. Sta. **1916**: 29–31), exhibits biologic specialization in the several countries visited thus accounting for the observed relative susceptibility of a given variety grown in different countries. Observations are reported also on the relation of climatic conditions to the prevalence of the disease in various countries. Sustained wet weather favors the parasite while dry weather is unfavorable.—*L. R. Hesler.*

746. Brittlebank, C. C. **Tomato diseases.** Jour. Dept. Agric. Victoria **17**: 231–235. 1919.—A new tomato disease, "spotted wilt," first found in 1915–16, has proved disastrous in 1918–19 in Victoria. The attack is first on the new terminal leaves. Brown and blackened areas scattered between the larger veins appear. The author states that it is the same disease that occurs in America (Phytopathology **6**: 162. 1919). Examination failed to disclose a causal organism, and inoculation experiments gave negative results. Experiments on sterilized soil suggest that the disease might be due to some chemical or physical deficiency in the soil.—*J. J. Skinner.*

747. Brittlebank, Charles. **Green manurial crops and "take all."** Jour. Dept. Agric. Victoria 17: 171–173. 1919.—See Bot. Absts. 3, Entry 848.

748. Chase, W. W. **Common insects and diseases of the apple.** Georgia State Bd. Entomol. Bull. 54. *51 p., 12 pl., 22 fig.* 1919.—Contains descriptions, life histories and methods of controlling the more common pests of the apple, *Pyrus malus*. The last part devoted to cultural directions.—*T. H. McHatton.*

749. Colón, E. D. **La eradicatión de la enfermedad de las rayas amarillas de la caña. [Eradication of yellow-stripe disease of cane in Puerto Rico.]** Estac. Exp. Insul. Puerto Rico Circ. 14. *6 p., 3 pl.* 1918.—A study of literature and specimens of mottled cane of Porto Rico has revealed that it is the same disease already known and studied in Java and Hawaii under the name of the "yellow stripe" disease. A summary of the facts known of the disease seems to indicate that it is a characteristic mosaic disease. [English translation in Agric. News Barbados 18: 62–63. 1919.]—*F. M. Blodgett.*

750. Coons, G. H. **The soft rot of hyacinth.** Rept. Michigan Acad. Sci. 20: 353–354. *Pl. 39–40.* 1918.—A rot of the hyacinth caused by *Bacillus carotovorus* is recorded. The disease is considered identical with a rot described by Heinz in 1889 and attributed to *Bacillus hyacinthi septicus.*—*L. M. Massey.*

751 Coons, G. H. **Michigan plant disease survey for 1917.** Rept. Michigan Acad. Sci. 20: 425–450. *Pl. 41–50.* 1918.—A summary of plant disease conditions in State of Michigan for 1917 based upon general observations and special reports. Specimens sent in by farmers and county agents furnished data for conclusions drawn. Reports were made on diseases of cereals, orchard and small fruits, vegetables, and conifers. The article shows the widespread distribution of these diseases and stresses the fact that they are easily communicable. It is the purpose of the Plant Disease Survey to stop the great leak in agriculture which results from preventable diseases, and in this capacity it deserves recognition by both state and nation.—*J. Norma Anderson.*

752. de Castella F. **Copper fungicides for vine diseases.** Jour. Dept. Agric. Victoria 17: 104–112. 1919.—It is shown that copper-soda sprays are most efficient when the copper is mainly in the form of basic sulphate, the advantages being greater stability, less scalding of foliage, and higher fungicidal power. When pure sodium carbonate is used the copper will be contained in the carbonate form. The class of mixture which causes the least damage is that which contains the maximum of tetracupric sulphate. Either an acid or alkaline copper soda causes foliage damage.—In the case of an alkaline spray, leaf injury is due not to excess soda, but to the presence of copper carbonate. Directions for mixing: dissolve 10 pounds of bluestone in 20 gallons of water and 3.5 pounds of soda ash in 30 gallons of water. Mix the 2 solutions and screen.—*J. J. Skinner.*

753. Dungan, George H., and John Pieper. **Control of important potato diseases and insect pests.** Illinois Agric. Exp. Sta. Ext. Circ. 31. *7 p.* 1919.—Treatments for the control of some of the potato diseases are given.—*M. J. Prucha.*

754. Earle, F. S. **Instrucciones para la eradicación de la enfermedad del mosaico de la caña. [Instructions for eradicating mosaic disease of cane.** Puerto Rico Estac. Exp. Insul. Circ. 14. *P. 6–8.* 1918.—The key to control, as the disease is not curable, consists in planting only healthy cuttings, either from healthy fields or resistant varieties. Care should be taken that new plantings be isolated from old. New planting should be inspected and diseased plants removed. [English translation in Agric. News Barbados 18: 62–63. 1919.]—*F. M. Blodgett.*

755. Edgerton, C. W. **The mottling disease or mosaic of sugar cane.** Louisiana Planter and Sugar Manufacturer 62: 397. 1919.—A disease of sugar cane which resembles the mottling disease of Porto Rico and probably is identical with it is present in some parts of Louisiana.

The loss caused to the sugar industry is evidently not as great as in Porto Rico though no reliable information is as yet available on this point. The presence of this disease possibly explains the deterioration in some varieties of cane which has been noticed during the past few years. The Japanese canes are immune to the disease.—*C. W. Edgerton.*

756. Elliott, John A. **A smut on Iresine.** Mycologia 11: 87–88. *Fig. 1–4.* 1919.—See Bot. Absts. 3, Entry 712.

757. Erwin, A. T. **Tip burn.** Potato Mag, 1[9]: 8, 34. *2 fig.* 1919.—Popular account of a potato disease, regarding cause, appearance, control and varietal susceptibility.—*Donald Folsom.*

758. Farrell, J. **Apple culture in Victoria.** Jour. Dept. Agric. Victoria 17: 145–157. *Pl. 6.* 1919.—A continuation of an article treating of apple diseases. For eradication of San José scale hydrocyanic acid gas is stated to be the most effective and reliable agent. A description of several fungus diseases is given and control measures are described.—*J. J. Skinner.*

759. Federal Horticultulal Board. U. S. Department of Agriculture. **Quarantine on account of black stem rust.** Service and Regulatory Announcements 62. *P. 58–59.* 1919.—On and after May 1, 1919, no species or cultivated varieties of *Berberis* or species of *Mahonia* may be shipped into the following states: Nebraska, Iowa, Illinois, Indiana, Ohio, North Dakota, South Dakota, Minnesota, Montana, Wisconsin, Michigan, Wyoming, and Colorado. These species have been largely eradicated from the states named. The purpose is to prevent the spread of black stem rust of cereals caused by *Puccinia graminis.*—*D. Reddick.*

760. Felt, E. P. **Insect galls and gall insects.** Ottawa Nat. 32: 127–131. *16 fig.* 1919.

761. Fischer, E. **Neueres über die Rostkrankheiten der forstlich wichtigsten nadelhölzer der Schweiz. [Recent information about important rusts of conifers of Switzerland.]** Schweiz. Zeitschr. Forstw. 49: 113–120. 1918.—See Bot. Absts. 3, Entry 713.

762. Fischer, Eduard. **Die Publikationen über die Biologie der Uredineen im Jahre 1917. [Publications on the biology of rusts in 1917.]** Zeitschr. Bot. 10: 389–395. 1918.

763. Gaines, E. F. **Comparative smut resistance of Washington wheats.** Jour. Amer. Soc. Agron. 10: 218–222. 1918.—Stinking smut [*T. laevis*] is more abundant in the winter-wheat section of Washington than anywhere else in U. S. A. It is not uncommon to find fields with 40 per cent smut.—Seed of 13 varieties was inoculated heavily with spores and planted in test rows. Turkey is the only highly resistant wheat of commercial importance in the list. —It seems probable from the outcome of the tests that two distinct factors function in resistance. One prevents infection, the other prevents smut-ball formation. If they do exist there is a high degree of correlation between them.—*D. Reddick.*

764. Gardner, Max William. **The mode of dissemination of fungous and bacterial diseases of plants.** Rept. Michigan Acad. Sci. 20: 357–423. 1918.—This phase of plant pathology is important, as attested by the extensive literature on the subject and by recent governmental activities along the lines of quarantine. Not only the agents of dissemination, but also adaptations of disease-producing organisms to these agents, are discussed. The text is first presented in topical outline form and the literature is then reviewed following the scheme presented in the outline. The natural agencies, most important in local spread, are air and wind, water, insect and other animals. Man in commercial and other practices is responsible for the dissemination of pathogenic bacteria and fungi over long distances. The list of references to literature contains 220 titles.—*L. R. Hesler.*

765. Gäuman, E. **Über die Spezialisation der Peronospora calotheca DeBary. [Specialization of P. calotheca.]** Svensk Bot. Tidsskr. **12**: 433–445. *2 fig.* 1918.—Using *Peronospora calotheca* from various plants, the author made infection experiments and measured a large number of conidia. The conclusion is reached that the Peronosporae on different species of the Rubiaceae are not only biologically but also morphologically different.—Instead of using the specific name *Peronospora calotheca* for all forms on Rubiaceae, different specific names should be applied to the forms on different hosts. Four new species of *Peronospora* are described.—*J. Rosenbaum.*

766. Gäuman, E. **Über die Spezialisation der Peronospora auf einigen Scrophulariaceen. [Specialization of Peronospora on Scrophulariaceae.]** Ann. Mycolog. **16**: 189–199. *6 fig.* 1918.—As a result of infection experiments, the author concludes that in the case of *Peronospora* found on plants belonging to the Scrophulariaceae possibly a greater biologic specialization is found than in many Uredineae. Study of the conidiophores and conidial measurements show that the majority of these biologically specialized forms can also be distinguished morphologically.—In some cases two different morphological species occur on the same host. Peronospora on *Linaria vulgaris* is mentioned as an example. In this case one form occurs on the reproductive and the other on the vegetative parts.—Seven new species of *Peronospora* are described.—*J. Rosenbaum.*

767. Gentner, G. **Über durch Macrosporium sarciniforme Cav. hervorgerufene Erkrankungen der Luzerne und des Klees. [Diseases of alfalfa and clover caused by M. sarciniforme.]** Prakt. Blätt. Pflanzenb. u. Pflanzensch. **16**: 97–105. 1918.—See Bot. Absts. 3, Entry 2651.

768. Gough, G. C. **Wart disease.** Gard. Chron. III, **63**: 206. *Fig. 90.* 1918.—Review of recent literature on potato wart "caused by *Synchitrium endobioticum*."—*D. Reddick.*

769. Graves, Arthur Harmount. **Some diseases of trees in greater New York.** Mycologia **11**: 111–124. *Pl. 10.* 1919.—A bark disease of the butternut is described in which limbs and whole trees are killed; *Melanconium oblongum* is associated with the disease. The most destructive disease of sweet birch, the symptoms of which are typical lipped cankers, is due to *Creonectria coccinea* (Pers) Seaver (Nectria coccinea Fr.). Winter injury or leaf scorch of the beech, heart rots of oaks caused by 3 fungi (*Globifomes graveolens* (Schw) Murr., *Inonotus hirsutus* (Scop.) Murr., and Pyropolyporus everhartii (Ellis & Gall.) Murr.), a bark disease of the paper mulberry caused by Creonectria purpurea (L.) Seaver (Nectria cinnabarina Fr.), injury to various trees from severe winter conditions of 1917–18, are among other diseases discussed.—*H. R. Rosen.*

770. Hill, Gerald F. **History of citrus canker in the Northern Territory.** Bull. Northern Territory, Australia 18. *8 p., 8 pl.* 1918.—An account of the discovery of citrus canker and the results of a subsequent careful examination of practically all known citrus trees in the Northern Territory of Australia, to which Territory the disease is confined. The disease has been found at Stapleton, Port Darwin, Darwin Botanic Gardens, Darwin Post Office, Point Charles Lighthouse, Cape Dow, and at the Aboriginal Reserve at Oenpelli. The discovery at Stapleton was made in December, 1912. *Pseudomonas citri* was isolated and identified. In the sections of the territory where the disease is found, infection is severe.—Spraying with Bordeaux mixture (4:4:50) and with copper soda sprays was ineffectual. All citrus trees in the infected areas have been burned and growing or importation for a period of five years prohibited. Government proclamation in 1915 prohibited importation of citrus trees from any part of the world. Later modification allows importation from California and Arizona, U. S. A.—Most of the trees in the infested regions came from the Botanic Gardens, Darwin. There is good evidence to show that the disease was introduced into Darwin Botanic Gardens from China and Japan.—*J. P. Benson.*

771. Hiltner, L. **Über Anquellung, Beizung und Impfung des Saatguts. [Soaking, disinfecting and inoculating seed.]** Prakt. Blätt. Pflanzenb. u. Pflanzensch. **16**: 105–111. 1918.

772. Johnson, James, and R. E. Hartman. Influence of soil temperature on the root-rot of tobacco. Jour. Agric. Res. 17: 41–86. *Pl. 1–8.* 1919.—Authors' summary is as follows: "(1) The root-rot of tobacco, caused by *Thielavia basicola*, is marked by the stunting of plants in various degrees due to a reduced root system. The extent of the damage is determined in a large measure by the environmental conditions surrounding the roots of the host.—(2) A study of these environmental conditions is essential to the proper understanding of the occurrence and distribution of the disease in general and local areas, and to good judgment in recommendation for control measures.—(3) There seems to be no variation in the pathogenicity of the root-rot fungus secured from different sources. The amount of disease is determined entirely by the susceptibility of the host, the amount of infestation, and the soil environmental factors surrounding the roots of the host. (4) The factors especially studied were the amount of infestation in the soil, the soil moisture, soil temperature, soil reaction, physical structure, and fertility. An analysis of these factors separately as related to root-rot frequently is very difficult, if not impossible. Under normal conditions the end result in injury by root-rot is the sum total of the favorable and unfavorable action of these factors on the disease. Some of these factors are much more important than others.—(5) Other factors aside, the extent of infection and injury from tobacco root-rot is directly proportional to the amount of infestation of the soil.—(6) Root-rot is seemingly capable of developing in relatively dry soils. Increasing the moisture content of the soil up to three-fourths of its water-holding capacity does not materially increase root-rot. Saturated soils are, however, considerably more favorable for the disease than unsaturated ones.—(7) The temperature of the soil is undoubtedly the most important factor determining the extent of the root-rot of tobacco, other factors being equal. The most favorable temperature for the disease ranges from 17° to 23°C. Below 15° the disease is less marked, and above 26° the severity is gradually reduced until at about 29° or 30° it has little or no influence. At 32° practically no infection occurs even in the most heavily infested soils. Soil temperature records in the field for four seasons indicate that occurrence of the disease under practical conditions is determined primarily by soil temperature.—(8) The disease is checked by very high soil acidity. Heavy infection can occur, however, in soils showing a considerable acid reaction. The results depend a great deal upon the susceptibility of the variety used in the test, the amount of infection, the soil temperature, and on other factors. The results of tests of Wisconsin tobacco soils indicate that the use of acid fertilizers will not reduce infection by *T. basicola.* Although alkaline soils are more favorable to disease than very acid ones, the use of lime on infested soils may not necessarily reduce the yield due to increased infection from *T. basicola.*—(9) The amount of organic matter present or introduced into the soil does not play a very important part in the amount of infection. High organic matter content, however, no doubt favors increased infestation and aids the fungus to persist in the soil. Where heavy inoculation is made, infection apparently occurs more readily in pure sand than in the presence of organic matter, but under conditions unfavorable for the parasite the amount of infestation is more rapidly reduced in soils lacking in organic matter.—(10) Clay soils as such seemingly are no more favorable for infection than sand, and under certain conditions possibly less so. Clay may, however, favor the persistence of the parasite in the soil, and may actually favor infection because of increased danger of saturation with water and because of the occurrence of lower temperatures than in sandy soils.—(11) Increasing the fertility of infested soil by pure chemicals is likely to cause increased stunting of growth rather than increased growth, especially if too high a concentration of soil solution results. Fertilizers applied to heavily infested soils under practical conditions seem to be largely wasted except in seasons in which such high temperatures result that the disease is held in check.—(12) Field observations and limited laboratory experiments seem to show that infested soils when compacted are more favorable for the disease than loose, open soil.—(13) Transplanting infected seedlings to an uninfested field is bad practice, although recovery from the disease may occur. Such recovery, environmental conditions aside, is proportional to the resistance of the type used."—Extensive experimental data are presented in detail in support of the conclusions. A bibliography of 27 titles is appended.—*D. Reddick.*

773. Johnson, James. The influence of heated soils on seed germination and plant growth. Soil Science 7: 10–103. *Pl. 1–8.*—See Bot. Absts. 3, Entry 854.

774. Klebahn, H. **Peridermium pini (Willd.) Kleb. und seiner Uebertragung von Kiefer zu Kiefer.** [P. pini and its passage from pine to pine.] Flora 111-112: 194–207. *Pl. 4–5.* 1918. —After a discussion of the validity of the species and the exhaustive but fruitless search for an alternate host Haack's experiments on direct inoculation with aeciospores are discussed. The author then outlines the problem, his own inoculation experiments, and their results. Thirty per cent of the 2- to 4-year old trees of *Pinus sylvestris* which were dusted with aeciospores of *Peridermium pini* developed infection; some showing the presence of mycelium, some bearing pycnia, and some bearing fully formed aecia within two years of the time of inoculation. The experiments were carefully controlled and they are therefore considered conclusive enough to establish the fact that *Peridermium pini* can spread directly from pine to pine by means of aeciospores. The author discusses the general question of susceptibility and the bearing of the results obtained on problems connected with the investigation of heteroecious rusts.—*Reginald H. Colley.*

775. Krakover, L. J. **The leaf-spot of red clover caused by Macrosporium sarcinaeforme Cav.** Rept. Michigan Acad. Sci. 19 (1917): 273–328. *5 pl., 2 fig.* 1918.—The writer reports investigation on red clover leaf spot caused by *Macrosporium sarcinaeforme* which attacks leaves and petioles of red clover but not alsike or other legumes. The writer describes fully the signs of the disease and the morphology of the causal organism. Inoculation experiments indicate that 5 to 7 days are necessary for spot formation. The injury caused by the fungus brings about the disintegration and collapse of the cells of the host, the fungus advancing intercellularly and intracellularly. The organism grows readily in media and its appearance on different substrata is described. Relations to temperature, humidity, light and dark are given. Attenuation was found in old cultures and this attenuation seems correlated with loss in power to produce substance toxic to the clover leaf. Wind of approximately 4 miles an hour velocity carried the spores 14.6 miles. Bibliography of 23 titles is appended.—*G. H. Coons.*

776. Lewis, A. C., W. W. Chase, and W. F. Turner. **Spray calender.** Georgia State Bd. Entomol. Bull. 53. *39 p., 2 pl., 8 fig.* 1919.

777. Lewis, A. C., and C. A. McLendon. **Cotton variety tests 1918.** Georgia State Bd. Entomol. Bull. 52. *40 p., 1 fig.* 1919.—See Bot. Absts. 3, Entry 473.

778. Lutman, B. F. **Osmotic pressures in the potato plant at various stages of growth.** Amer. Jour. Bot. 6: 181–202. *1 table, 2 fig.* 1919.—See Bot. Absts. 3, Entry 800.

779. Makemson, Walter Kenneth. **The leaf mold of tomatoes caused by Cladosporium fulvum Cke.** Rept. Michigan Acad. Sci. 20: 309–350. *Pl. 23–37.* 1918.—Tomato leaf mold (*Cladosporium fulvum* Cke.), appearing as velvety, tawny-olive colored patches on the under side of the leaf and as yellow spots produced in the tissue above, occurs in southern climates as a serious disease of field grown plants and of plants grown under glass in northern latitudes. Fruits once set escape the disease, and main stems of the vines are not often attacked. Blossoms are especially susceptible. Successful inoculation experiments are reported. Infection is stomatal. The mycelium is both inter- and intra-cellular. Minimum temperature for growth of fungus is 9°C., the optimum 20° to 25°C., and the maximum below 34°C. Moisture favors growth. Strong, diffuse light retards spore formation. The fungus grows best on a reaction of medium varying from +10° to +15° Fuller's scale, but withstands a considerable range in reaction. Translocation of starch in infected plant leaves is interfered with. Organism is disseminated by air currents. Period of incubation is usually from 6 to 10 days, but may be longer depending on conditions of humidity and temperature. Growth as a saprophyte may enable the fungus to exist between crops, but the longevity of the conidia probably accounts for its survival. Bordeaux mixture proved inefficient in the control of the disease; ammoniacal copper carbonate, sulfide of potassium and sulfur dust also valueless. Self-boiled lime-sulfur and concentrated lime-sulfur solution gave evidence of value, the former giving results more promising in moist chamber experiments but less effective under natural conditions than the latter. Sulfur fumigation, ventilation control and clean culture are recommended as prophylactic measures.—*L. M. Massey.*

780. McHatton, T. H., and J. W. Firor. **Spray calender for Georgia.** Georgia State Coll. Agric. Bull. 170. *12 p., 3 fig.* 1919.

781. Osborn, T. G. B. **Report of the Consulting Botanist and Plant Pathologist.** Rept. Min. Agric. South Australia 1917–18:——. 1918. [Issued separately, *3 p.*]—"Take-all" (*Ophiobolus graminis*) on oats is reported, but the disease is not so severe as on wheat and barley.—A species of *Alternaria* was apparently responsible for barren wheat plants.—Leaf stripe, *Helminthosporium inconspicuum*, on *Zea mays* is reported for the first time.—The following potato diseases were found: early blight (*Alternaria solani*), wilt (*Fusarium solani*), Irish blight (*P. infestans*), scab (*Rhizoctonia solani*); the latter disease is responsible for reduction in yield and a depreciation of the crop.—A dieback of apricots is attributed to senility.—*Coniothecium chromatosporium* is constantly associated with a canker of apple and pear.—*Venturia pomi*, of apples and pears, causes blossom rot of certain sheltered apple trees.—A bacterial disease of *Citrus* is being studied.—The following diseases have been found: onion mildew (*P. schleideniana*), cucurbit mildew (*Erysiphe cichoracearum*), streak of sweet pea (*Bacillus lathyri*), anthracnose of *Platanus* (*Gloeosporium nervisequum*), also found injuring American oaks (*Quercus* sp.), rhododendron leaf disease (*Gloeosporium rhododendri*), poplar leaf blister (*Taphrina aurea*), smut of couch grass (*Cynodon dactylon*) caused by *Ustilago cynodontis*.—*D. Reddick.*

782. Palm, B. J. **Sur une Plasmodiophoracée nouvelle, Liginera isoetis.** [A new slime-mold.] Svensk Bot. Tidsskrift 12: 228–232. *3 fig.* 1918.—See Bot. Absts. 3, Entry 729.

783. Parrott, P. J., H. E. Hodgkiss, and F. Z. Hartzell. **The rosy aphis in relation to abnormal apple structures.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 66. *29 p., 8 pl. (2 colored), 6 fig.* 1919.—Apples attacked by rosy aphis (*Aphis sorbi* Kalt.) are abnormally small, poorly colored and unsymmetrical. They contain fewer seeds than normal apples, the seeds are of smaller average size, and more of them are imperfect. Also, the seeds are more variable in number and weight. Although attacks by rosy aphis increase the number of small, few-seeded and seedless fruits, the number of such fruits which fall prematurely is fewer than under normal conditions. Different structures of the apple are affected in different degrees, the weight of the fruit being most affected, weight of seeds next, and number of seeds least. Both in aphis-injured apples and normal apples the relation between fruit weight and seed weight appears to be closer in small fruits than in large ones; but this relation is not very marked in any case. While there is no reduction in the number of primary fibro-vascular bundles, even in severely malformed fruits, their development is arrested on the side of greatest distortion, and the number of ultimate branches is much fewer than in normal fruits.—*F. C. Stewart.*

784. Pollock, J. B. **The longevity in the soil of the Sclerotinia causing brown rot of stone fruits.** Rept. Michigan Acad. Sci. 20: 279–280. 1918.—Evidence is set forth to show that the sclerotia of the *Sclerotinia* causing plum brown rot may remain alive in fallen mummied fruits for 10 years at least, and some of them produce apothecia every year. It is suggested that this longevity of the fungus renders control by disposal of mummied fruits more difficult.—*L. R. Hesler.*

785. Reed, George M. **Phytopathological survey of the trees and shrubs of Prospect Park and the Botanic Garden (Brooklyn). II. Report of the second season's work.** Brooklyn Bot. Gard. Rec. 7: 14–23. Jan., 1918.—Continuation of: Same title. I. Report of the first season's work (*Ibid.* 6: 14–20. Jan., 1917).—The area intensively surveyed contained approximately 1830 trees, representing about 50 different kinds. 231 trees had decayed areas classified as major, and 192 trees had decayed areas classified as minor. Thus 423 trees, or a total of 23 per cent were found to be injured by decay producing fungi. Certain kinds of trees, as the silver maple, Norway maple, the ashes, and the birches, showed a very high percentage (25 to 50 per cent) of decayed areas. Other species showed lower percentages of injury.—*C. S. Gager.*

786. Sharples, A. **The laticiferous system of Hevea brasiliensis and its protective function.** Ann. Bot. **32**: 247–251. 1918.—See Bot. Absts. 1, Entry 1409.

787. Shinbo, Ippo. **Beiträge zur Kenntniss einiger einheimischen Pflanzengallen in Japan.** [A Japanese plant gall.] Bot. Mag. Tokyo **33**: 1–12. *3 fig.* 1919.

788. Stakman, E. C. **Destroy the common barberry.** U. S. Dept. Agric. Farmers' Bull. 1058. *11 p., 6 fig.* 1919.

789. Stakman, E. C. **Banish the barberry and save the wheat.** Amer. Assoc. Nurserymen Ann. Conv. **43**: 41–46. 1918.

790. Stevens, Frank Lincoln. **An apple canker due to Cytospora.** Illinois Agric. Exp. Sta. Bull. 217: 367–379. *1 pl., 15 fig.* 1919.—The disease was found on the main trunk of a young apple tree, the diseased area, 22 cm. wide, encircling the tree trunk. The fungus appeared as small black pustules under, or erumpent through the cuticle. Under the microscope these proved to be compound pycnidia. No ascigerous structures were found. The method of isolation is described. Artificial inoculations in test tubes of apple and other twigs with the pure culture proved successful. Though the fungus here discussed agrees well with *Cytospora* of *Valsa leucostoma*, it is best to defer final judgment as to its specific name.—*M. J. Prucha.*

791. Stevens, F. L., and Esther Y. True. **Black spot of onion sets.** Illinois Agric. Exp. Sta. Bull. 220: 507–532. *Fig.* 1–19. 1919.—The disease causes serious losses, appearing on onions during storage, particularly on onion sets of white varieties. Several fungi were found present on the diseased specimens, the so-called *Vermicularia* being present in 60 to 80 per cent of onion sets examined.—The disease has been found in many states. It assumes three distinctly different types. The most common type appears as a nearly black spot, about 1 cm. in diameter, on the dry outer scales of the bulb. In this spot numerous black knots of mycelium are seen. They are typical sporodochia and the new combination *Volutella circinans* is proposed. The mycelium is 3.6 to 10.8 μ in diameter, irregularly branched and cut by septa at irregular intervals. Perithecia were found in organic connection with mycelium recognizable as that of the fungus causing the disease. A new genus, *Cleistothecopsis*, is proposed for the fungus, the chief difference from *Cleistotheca* being that conidial stages are unlike.—The rapid drying of the onion sets is emphasized as the preventive measure.—*M. J. Prucha.*

792. Stevens, Frank Lincoln. **Two Illinois rhubarb diseases.** Illinois Agric. Exp. Sta. Bull. 213: 299–312. *Fig. 1–19.* 1919.—*Anthracnose* is due to *Colletotrichum erumpens.* The disease was found in several Illinois counties. It consists of a soft rot of the petioles; the diseased spots usually are soft, watery, and oval. When these spots attain a length of somewhat more than a centimeter, acervuli appear abundantly in the centers of the spots. The acervuli begin subcuticularly as an aggregate of hyphae which soon rupture the cuticle. Soon after this, the setae appear and spores begin to form. The fungus is readily isolated; its cultural characters are described, and its taxonomy is discussed.—Rhubarb *leaf spot* is due to *Phyllosticta straminella.* It mainly affects the leaf blade, forming irregularly circular dead spots from a few to several centimeters in diameter. Close inspection shows numerous very minute dark pycnidia. The microscope reveals the presence of a pycnidial fungus of the Phoma or Phyllosticta type. Spores issue in cirrhi. Cultural characters and taxonomy are given.—*M. J. Prucha.*

793. Tanaka, Tyôzaburô. **New Japanese fungi. Notes and translations. VI.** Mycologia **11**: 80–86. 1919.—See Bot. Absts. 3, Entry 730.

794. Tanaka, Tyôzaburô. **New Japanese fungi.—Notes and translations. VII.** Mycologia **11**: 148–154. 1919.—See Bot. Absts. 3, Entry 731.

795. Waldron, L. R., and J. A. Clark. Kota, a rust resisting variety of common spring wheat. Jour. Amer. Soc. Agron. 2: 187–195. *Fig. 1–3.* 1919.—See Bot. Absts. 3, Entry 484.

796. Wehmer, C. Leuchtgaswirkung auf Pflanzen. [Effects of illuminating gas upon plants.] Ber. Deutsch. Bot. Ges. 36: 140–149. 1918.—See Bot. Absts. 2, Entry 614.

797. Weir, James R. Concerning the introduction into the United States of extra-limital wood-destroying fungi. Mycologia 11: 58–65. 1919.—Attention is called to the absence of quarantine laws providing for a close scrutiny of imported timbers which may harbor wood-destroying fungi. *Polystictus persoonii* and *Trametes atypus* which are common and evidently serious rot producers in Japan and the Philippines were found on rotted timbers at Bellingham, Washington. Explanations are presented for the apparent small number of wood-destroying fungi in the tropics, and for the possibility of such species becoming serious pests in the temperate zone.—*H. R. Rosen.*

798. Wurth, Th. Vershlag omtrent de werkzaamheden van het Proefstation Malang over 1917. [Review of experiment station activities for 1917]. Meded. Proefst. Malang. Java 22: 1–20. 1918.—Notes are given on some diseases of Para rubber and coffee. For the former, daily prophylactic disinfection of the tapping cut was found necessary to prevent the spread of canker (*Phytophthora faberi*). Die-back (*Gloeosporium alborubrum*) was severe on trees of all sizes: for the control of it pruning out the diseased parts and spraying adjacent trees with bordeaux mixture are recommended. The brown root disease (*Hymenochaete noxia*) of coffee was most severe where this crop was planted with *Ficus* and *Hevea*.—*R. D. Rands.*

799. Young, Harry C., and E. H. Cooper. A method of determining the fungicidal coefficient of lime-sulfur and other common fungicides. Rept. Michigan Acad. Sci. 19 (1917): 221–236. 1918.—The writer formulated a method to determine fungicidal value of fungicides based on the government Hygienic Laboratory method of Anderson and McClintic which determines the bacterial coefficiency of disinfectants by comparing them with a phenol solution of a standard strength. The writer used *Glomerella rufomaculans* and *Endothia parasitica* with lime-sulfur, ammoniacal copper carbonate and neutral copper acetate against a copper solution of a standard strength.—*G. H. Coons.*

PHYSIOLOGY

B. M. Duggar, *Editor*

DIFFUSION, PERMEABILITY

800. Lutman, B. F. Osmotic pressures in the potato plant at various stages of growth. Amer. Jour. Bot. 6: 181–202. *1 table, 2 fig.* 1919.—A series of determinations of the osmotic pressure of sap from various regions in the potato plant at various stages in its growth was made by the use of the method of freezing-point depression. The pressure in seed tubers was found to be between 7 and 10.3 atmospheres, but this is considerably lowered by the absorption of water after planting. The juice of leaves from the young plant shows a higher pressure than that from the stalk, and both are higher than that from the seed piece. With the formation of flower buds and young tubers, the pressure becomes greater in the stalk than in the leaves. In the tuber the pressure remains constant from the first. The pressure in the stalk continues high throughout the active tuber and starch period, due to the presence there of an abundant supply of sugar; but with the return of cool weather and the renewed growth of foliage, it is finally exceeded by the pressure in the new leaves. The pressure in old plants is higher than in young ones, but falls as the plant becomes moribund. The author concludes that a superior osmotic pressure is necessary for the formation of new growth but is not necessary to maintain an organ after it has been formed. He points out the necessity

of assuming that leaves are directly connected with the root system by a series of tubes the side walls of which are comparatively impermeable, since otherwise the water would be removed from the tubes by the cells of the stalk, where osmotic pressure is higher than in the leaves. He concludes also that high osmotic pressure is not necessary for the growth of reproductive organs, since both tubers and potato berries (as well as tomato fruits) attract to themselves an abundant supply of reserves, although they maintain a very low osmotic pressure. The factors which control the movement of food reserves is unexplained. The bearing of these investigations on the physiological disease of potatoes known as "tip-burn" is set forth.—*E. W. Sinnott.*

801. Shearer, C. **The action of electrolytes on the electrical conductivity of the bacterial cell and their effect on the rate of migration of these cells in an electric field.** Proc. Cambridge Phil. Soc. 19: 263–265. 1919.—The conductivity of a thick creamy emulsion of the meningococcus or *B. coli* made up in neutral Ringer's solution and measured by a Kohlrausch bridge and cell shows that its resistance is 110 ohms or more than treble that of the Ringer's solution without the bacteria. A bacterial emulsion made of NaCl (0.85 per cent) has a resistance of 110 ohms. This gradually drops so that the resistance becomes equal to that of 0.85 per cent NaCl solution without bacteria. KCl, LiCl, and $MgCl_2$ act like NaCl in reducing the resistance offered by bacteria. Bacterial emulsions made up in $BaCl_2$, $CaCl_2$, and $SrCl_2$ having the same conductivity as Ringer's solution show no change in resistance for some time, invariably remaining normal. Certain trivalent salts have no action in increasing or decreasing the resistance of the bacterial cell as determined by the conductivity method, but affect the rate of migration of these cells in an electric field.—*Michael Levine.*

WATER RELATIONS

802. Shreve, Edith B. **Investigations on the absorption of water by gelatin.** Jour. Franklin Inst. 187: 319–337. 1919.—Physiological conclusions from the incomplete information at present available concerning imbibition by jellies are shown to be unwise. The advantages and disadvantages of the various methods of measuring imbibition are discussed. The method of weighing was adopted for this work. The rate of imbibition and the total quantity of imbibed water at apparent equilibrium increased with increase of temperature. No true equilibrium seems attainable at any given temperature between 10° and 30°C., if sufficient time is allowed. In the Hofmeister series all the compounds except sugar caused increased imbibition when incorporated in the composition of the gel preliminary to the imbibition tests. This is quite different from Hofmeister's results when the compounds are in the surrounding liquid, for then some do and some do not cause swelling.—*Ernest Shaw Reynolds.*

803. Stewart, E. Grace. **Mucilage or slime formation in the cacti.** Bull. Torrey Bot. Club 46: 157–166. *Pl. 8.* 1919.—A review of views of earlier workers. It appears that opinions are about equally divided as to whether mucilage arises from the wall or from the protoplasm, but several agree that it is accumulated between the plasma membrane and the wall. A study was made of *Rhipsalis rhombea, R. pachyptera, R. Houlletiana, Opuntia inermis,* and *Pereskia Pereskia.* In the leaves of flower buds of *Opuntia* and of *Rhipsalis* and in the other young tissues mucilage cells are often large and numerous, but their size is not due to imbibition of water by the mucilage; it is due to true growth, and becomes evident before any mucilage formation has begun. The mucilage appears first as a thin film between cell wall and cytoplasm, and as it increases the cytoplasm is crowded in toward the center of the cell, the mucilage becoming alveolar; the cell wall nowhere shows a breaking down. Imbibition experiments show that joints of *Rhipsalis* swell, particularly in the growing regions, this transformation of cell-contents into mucilage which absorbs water, "may be of importance in conserving and regulating the supply of water for the growing cells themselves."—*P. A. Munz.*

MINERAL NUTRIENTS

804. Purvis, J. E. **Bracken as a source of potash.** Proc. Cambridge Phil. Soc. 19: 261–262. 1919.—See Bot. Absts. 3, Entry 479.

METABOLISM (GENERAL)

805. Bates, Frederick, and H. W. Bearce. New Baumé scale for sugar solutions. Jour. Franklin Inst. 187: 215. 1919.

806. Hawk, Philip B., Hamilton R. Fishback, and Olaf Bergeim. Compressed yeast as food for the growing organism. Amer. Jour. Physiol. 48: 211–220. 1919.—Young white rats, when given a complete diet except for lack of "water-soluble vitamine," showed loss of weight or exceptionally low gains, but when small quantities of dried Fleischmann yeast were added to the diet immediate, substantial gains took place. The growth-promoting power of compressed yeast is not destroyed by heating to 105°C.—*Ernest Shaw Reynolds.*

807. Hawk, Philip B., Clarence A. Smith, and Ralph C. Holder. Baker's yeast as food for man. Amer. Jour. Physiol. 48: 199–210. 1919.—Fleischmann yeast was used as a substitute for varying percentages of the protein diet and also at times as the source of the "water-soluble vitamine." Under both of these conditions yeast was found to be useful to the body, and in large quantities it had a laxative action.—*Ernest Shaw Reynolds.*

808. Hollingshead, R. S. Chemical analyses of logan blackberry (loganberry) juices. U. S. Dept. Agric. Bull. 773. *12 p.* 1919.—See Bot. Absts. 3, Entry 808.

809. Ichimura, Tsutsumi. On the localization of anthocyanin in the spring leaves of some trees and shrubs in the temperate regions of Japan. Bot. Mag. Tôkyô 33: 12–15. 1919.—This paper describes the localization of anthocyanin in the young leaves of 69 species of Japanese plants belonging to 31 families, including in this account 45 genera. The results are presented in tabular form and show that in the majority anthocyanin occurs in the mesophyll, or both epidermis and mesophyll. The figures are as follows: epidermal hairs, 3 per cent; epidermis, 10 per cent; mesophyll, 47 per cent; epidermis and mesophyll, 39 per cent. "It is also noticeable that the lower epidermis and lower hypodermal layer are richer in the pigment than the upper ones in the young leaves."—*L. L. Burlingame.*

810. Kendall, Arthur I., and Marjorie Ryan. A double sugar medium for the cultural diagnosis of intestinal and other bacteria. Jour. Infect. Diseases 24: 400–404. 1919. —A new double sugar medium is described; this medium consisting of nutrient agar containing 2.5 per cent agar, 1 per cent saccharose, and 0.1 per cent mannitol, the reaction being adjusted so that the color, when the Andrade indicator is added, is faintly pink when hot. This medium can be advantageously applied to the cultural diagnosis of aerobic bacteria in general.—*Selman A. Waksman.*

811. Lynch, Vernon. The function of the nucleus of the living cell. Amer. Jour. Physiol. 48: 258–283. 1919.—Enucleated *Ameba proteus* cells live almost as long as nucleated cells deprived of food; movements are somewhat affected; nutrition is disturbed; and sensitiveness to changes of oxygen content of the environment, to high or low temperatures, and to cyanide is increased. The results favor the "synthesis" theory of function of the nucleus. —*Ernest Shaw Reynolds.*

812. Mottram, V. H. Sudan III and the detection of fat. Jour. Physiol. [London] 52^1: xviii-xix. 1918.—"One gram of the powdered solid is shaken with 10 cc. of the saturated solution of Sudan III in 70 per cent alcohol for a minute. The fluid is filtered off through a small fat-free filter paper and the color of the resultant compared with that of a control." For the control 1 gram of fat-free powder is treated as above. "When the tested solid contains more than 0.04 gram of fat the Sudan III filtrate is markedly lighter in color than the control." A colorimetric quantitative method for determining fat content might be worked out upon this basis.—*Ernest Shaw Reynolds.*

813. Voegtlin, Carl, and C. N. Myers. **Distribution of the antineuritic vitamine in the wheat and corn kernel.** Amer. Jour. Physiol. 48: 504–511. 1919.—Feeding experiments of "degerminated" corn and wheat in contrast with whole grain upon adult pigeons show that the vitamine is entirely in the embryo; and suggestions are made that the germination processes depend upon the presence of the vitamine, possibly due to direct relationship to metabolism.—*Ernest Shaw Reynolds.*

814. Zerban, F. W. **Progress report of Chemical Research Department of the Louisiana Sugar Experiment Station for 1918.** Louisiana Planter and Sugar Manuf. 62: 219–223. 1919.—There are various substances in sugar cane that affect the color of the cane juice. These include chlorophyll, anthocyanin and saccharetin. The different polyphenol compounds, especially in the presence of iron, are largely responsible for the darkening of the cane juice.—*C. W. Edgerton.*

METABOLISM (NITROGEN RELATIONS)

815. Zerban, F. W., and E. C. Freeland. **The color of sugar cane products and decolorization in factory practice.** Louisiana Agric. Exp. Sta. Bull. 165. *32 p.* 1919.—The coloring matter in cane juice is mostly due to anthocyanin and the different polyphenol compounds, especially in connection with iron.—*C. W. Edgerton.*

816. Koser, Stewart A., and Leo F. Rettger. **Studies on bacterial nutrition. The utilization of nitrogenous compounds of definite chemical composition.** Jour. Infect. Diseases 24: 301–321. 1919.—Various amino-acids are quite similar in their ability to support the growth of certain microörganisms. Urea, taurin, creatin, hypoxanthin and uric acid are inferior to amino acids as immediately available sources of nitrogen. Allantoin gives results similar to the amino acids. Combinations of amino-acids or of amino-acids and other nitrogenous compounds offer no advantage over any single amino-acid. Certain organisms, such as *B. anthracis, Proteus zeukeri, B. abortus, B. diphtheriae, B. hoffmanni, B. dysenteriae,* and all of the cocci studied with the exception of *Sarcina lutea*, in a few cases, consistently failed to develop in all of the media employed. *B. pullorum* developed slightly in one instance only, while *B. typhosus* exhibited a slight growth in a few media. An extensive bibliography is appended.—*Selman A. Waksman.*

METABOLISM (ENZYMES, FERMENTATION)

817. Coates, C. E. **Some notes on the clarification of the juice from frozen and sour cane.** Louisiana Planter and Sugar Manuf. 62: 40–41. 1919.—In sugar cane which has been frozen, three types of fermentation develop. (1) There may be a softening of the tissues of the cane with the release of gummy substances into the juice. (2) Gums may be produced by the fermentation processes, these being induced by *Leuconostoc* and other organisms. (3) Acetic acid fermentation may develop. Methods of treating the cane juice to counteract the fermentation processes are discussed.—*C. W. Edgerton.*

818. Diehl, Harold S. **The specificity of bacterial proteolytic enzymes and their formation.** Jour. Infect. Diseases 24: 347–361. 1919.—No proteolytic enzymes are formed by bacteria on media free from organic nitrogen. On protein-containing media enzymes are formed which will digest both gelatin and casein. The proteolytic enzymes are not preformed in the bacterial cell, but are dependent on the content of the medium on which the cell grows; the specificity of these enzymes is resident in the amino-acids composing the proteins and not in the proteins themselves. Proteolytic enzymes are apparently formed to correspond to the different amino-acids present in the medium whether these acids are combined or free.—*Selman A. Waksman.*

819. Kopeloff, Nicholas, and Lillian Kopeloff. **The deterioration of cane sugar by fungi.** Louisiana Agric. Exp. Sta. Bull. 166. *72 p., Pl. I, II; fig. 1.* 1919.—Fungi are to be found in practically all sugars and sugar products. Of these, species of *Aspergillus* and

Penicillium are the most abundant. In culturing these fungi, Czapek's agar seemed to be the most efficient, as a greater number of forms grew on this medium. The various species of fungi were inoculated into sterilized sugars and the amount of deterioration of the sucrose was obtained. Unless the moisture content was reduced to a minimum there was considerable deterioration, this varying with the different forms. A species of blue *Aspergillus* was not only the most common in sugars but also caused the greatest deterioration. The spores of this fungus contain invertase and can produce an inversion of the sucrose without the development of mycelium.—*C. W. Edgerton.*

820. Kopeloff, Nicholas, and Lillian Kopeloff. Some new phases of the problem of preventing sugar deterioration. Louisiana Planter and Sugar Manuf. 62: 237–238. 1919.—Molds such as species of *Aspergillus* and *Cladosporium* occur in all sugar products causing a deterioration, especially if the moisture content is high. Spores of some of these fungi contain the enzyme invertase and a gum-forming enzyme. Consequently the presence of these spores, even if they do not germinate, may result in a deterioration of the sugar.—*C. W. Edgerton.*

821. Purvis, J. E. The conversion of saw-dust into sugar. Proc. Cambridge Phil. Soc. 19: 259–260. 1919.

ORGANISM AS A WHOLE

822. Dufrenoy, J. Les réactifs biologiques de l'espèce et la spécifité parasitaire. [Biological reagents and specific reactions of parasites.] Rev. Gén. Sci. Pur. et Appl. 30: 44–47. 1919.—A brief essay, based on recent papers by Stakman, Piemeisel, Peltier, Chapman, Legrand, and others, showing that living organisms are the most delicate reagents of which we now have any knowledge or control, certain parasitic bacteria and fungi distinguishing not only between species with obscure characters but between varieties or strains in which no distinguishing characters are visible. [See Bot. Absts. 2, Entry 1033.]—*G. J. Peirce.*

GROWTH, DEVELOPMENT, REPRODUCTION

823. Doncaster, L. Note on an experiment dealing with mutation in bacteria. Proc. Cambridge Phil. Soc. 19: 269. 1919.—See Bot. Absts. 3, Entry 621.

824. McCall, A. G., J. B. S. Norton, and P. E. Richards. Abnormal stem growth of soybeans in sand cultures with Shive's three-salt nutrient solution. Soil Science. 6: 479–481. *Pl. 1, 2.* 1918.—See Bot. Absts. 3, Entry 859.

825. Salter, Raymond C. Observations on the rate of growth of B. coli. Jour. Infect. Diseases 24: 260–284. 1919.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

826. Engler, Arnold. Tropismen und exzentrisches Dickenwachstum der Bäume. Ein Beitrag zur Physiologie und Morphologie der Holzgewächse. [Tropisms and eccentric growth in thickness of trees.] Preisschr. Stiftung Schnyder von Wartensee. 21: 1–106. *14 pl., 16 fig.* Beer and Co.: Zürich, 1918.—Stout stems, as well as young twigs, of coniferous and dicotyledonous trees are subject to geotropic bending. The latter arborescent plants are also subject to heliotropic bending. In plagiotropic dicotyledons the eccentric growth on the upper sides of branches and inclined stems—regardless of convexity or concavity—is due to gravitational stimuli, whereas eccentric growth of the undersides of branches and stems is induced by longitudinal compression of the cambium. Longitudinal tension does not produce eccentricity. Not all portions of the stem are equally geotropic or heliotropic. "Horizontal" eccentricity of branches occurs where the effects of gravity and compression neutralize each other. The author devotes considerable attention to the study of the form of trees growing on steep slopes and offers an hypothesis to account for the *modus operandi* of bending in thick stems. [See Bot. Absts. 3, Entry 691.]—*I. W. Bailey.*

TEMPERATURE RELATIONS

827. Taylor, N. **Effects of the severe winter (1917-18) on the woody plants of the Garden.** Brooklyn Bot. Gard. Rec. 7: 83–87. 1918.

828. Gray, G. P. **Tests of chemical means for the control of weeds.** Univ. California Publ. (Agric. Sci.) 4: 67–97. *Fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 470.

TOXIC AGENTS

829. McMaster, Philip D. **The germicidal power of antiseptic oils and of substances dissolved in oil.** Jour. Infect. Diseases 24: 378–385. 1919.—A method is suggested for determining quantitatively the germicidal power of antiseptic oils and substances dissolved in oil. It consists in inoculating *B. typhosus* on agar slants, well drained of water of condensation, over an area not more than 1 centimeter and well above the middle of the tube; the cultures are incubated 24 hours. The oily solutions are then poured over the slants so as to entirely cover the agar, and the tubes allowed to stand 24 hours at 37.5°C. The oily solutions are then poured off and the tubes twice washed out carefully with sterile salt solution; a transfer is then made from the washed slant to a tube containing standard broth; after 24 to 48 hours incubation readings are taken. Phenol dissolved in mineral oil was found to approach, in its germicidal value, that of its value in water and can serve as an arbitrary standard for comparison when testing the activity of other oils and oil-soluble substances.—*Selman A. Waksman.*

830. Schamberg, Jay F., John A. Kolmer, George W. Raiziss, and Mary E. Trist. **Sodium oximercury-ortho-nitrophenolate (Mercurophen) with special references to its practical value as a disinfectant.** Jour. Infect. Diseases 24: 547–582. 1919.—Mercurophen (sodium oxymercury-ortho-nitrophenolate) was found to be equal or superior to mercuric chloride and other mercurial compounds containing more mercury; at the same time the sodium salt is more rapid in germicidal activity. It also maintains a higher degree of germicidal activity in blood serum than mercuric chloride; does not precipitate protein in as high a concentration as 1:100, and does not irritate the skin or tarnish the surgical instruments. It is less toxic for animals and is somewhat more trypanocidal than mercuric chloride. [See Bot. Absts. 3, Entry 2750.]—*Selman A. Waksman.*

831. Singh, T. M. **Toxicity of "alkali" salts.** Soil Science 6: 463–477. 1918.—See Bot. Absts. 3, Entry 864.

MISCELLANEOUS

832. Erwin, A. T. **Tip burn.** Potato Mag. 1[9]: 8, 34. *2 fig.* 1919.—See Bot. Absts. 3, Entry 757.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

833. Anonymous. **Cinchona research in Java.** De Indische Mercuur (Jan. 24, 1919). [Through Chem. and Druggist 91: 286. 1919.]—The Cinchona Experiment Station in Java is most satisfactorily solving some of the problems in connection with cinchona culture in the Indies. M. Sluiter, Botanist, has undertaken a research on the morphology of flower and fruit formation in cinchona in connection with the production of hybrids. An investigation into the effect of humidity on the causation of diseases in cinchona is under way. Much complaint has been made regarding the poor quality of the cinchona seed supplied by the government plantations, and Dr. J. J. Van Hall has demonstrated the presence of a mite in the seed beds that causes large losses; efforts are being made to eradicate this pest. The effect of the temperature of drying on the alkaloidal content of the bark is being studied and an effort made to obtain concordant results in analyses made in Java and in Holland.—*E. N. Gathercoal.*

834. ANONYMOUS. **Egyptian opium.** Repert de Pharm. 74: 345. [Through Pharm. Jour. 102: 219. 1919.]—The area devoted to cultivation of the opium poppy (*Papaver somniferum*) in Egypt has varied from 5000 acres in 1833 to 1500 acres in 1917. The white-flowered variety is used and is chiefly grown in the islands of upper Egypt, which are annually inundated. The seed is sown in October and November, the inspissated juice is collected in February and March, and the finished opium usually contains not more than 7 per cent of morphine, though lots containing from 12 to 15 per cent are not uncommon. The cultivation is free, but trading in opium is prohibited, though it is sold clandestinely. None is exported.—*E. N. Gathercoal.*

835. ANONYMOUS. **Ground liquorice root.** Pharm. Jour. 102: 177. 1919.—In court proceedings in Birmingham, England, the claim made by the City Analyst, that "ground liquorice root" (the pulverized dried root of *Glycyrrhiza glabra*) must contain not more than 9 per cent of ash and that 16 per cent of it should be soluble in water, was not sustained. The evidence tended to show further, that "ground liquorice root" should not be deemed a drug under the Act considered.—*E. N. Gathercoal.*

836. EWING, C. O., AND E. E. STANFORD. **Conium maculatum L., and Aethusa cynapium L., an adulterant.** Jour. Amer. Pharm. Assoc. 8: 385. *Pl. 1–2, fig. 1.* 1919.—A recent importation of "Conium leaves" proved to consist chiefly, not of *Conium*, but of *Aethusa*. The differential characteristics of *Conium maculatum* and *Aethusa cynapium*, are given. The paper also includes the results of alkaloidal assays which showed *Conium* to contain 0.013 per cent of alkaloid. Two samples of *Aethusa* contained 0.0013 and 0.0002 per cent respectively. The authors suggest that the *Conium* herb, because of its notorious variability and its previously reported rapid deterioration, might properly be entirely deleted from the materia medica; the more so as the fruit of the plant (*Conium* N. F.) contains the alkaloids of hemlock in very much larger amounts.—*Anton Hogstad, Jr.*

837. KOCH, GEORGE P. **Atropa Belladonna.** Jour. Amer. Pharm. Assoc. 8: 390–405. 1919.—Author reports on the cultivation of belladonna as conducted at the Mulford Biological Laboratories. The extensive paper is divided into subjects as follows: (1) Germination of seeds. (2) Planting. (3) Effect of fertilizers on growth. (4) Effect of moisture on growth. (5) Effect of shade on growth and development. (6) Means of combating insects. (7) Effect of drying leaves at different temperatures, upon the alkaloidal content. (8) Production of seeds. (9) Influence of the presence of stems, upon the alkaloidal content of leaves.—*Anton Hogstad, Jr.*

838. MCCUTCHEON, ALEXANDER. **Some Highland household remedies.** Pharm. Jour. 102: 235–236. 1919.—In the Badenoch district of Invernesshire (Scotland), the trained physician and the pharmacist are unknown and illness is treated with household remedies. The drugs most used are the root of *Menyanthes trifoliata* (buck bean), the herbs of *Geranium Robertianum* (herb Robert), *Stellaria media* (chickweed), *Artemisia absinthium* (wormwood), *Marrubium vulgare* (horehound), *Plantago lanceolata* (plantain), and the root stalk of *Rumex obtusifolius* (yellow dock). The *Menyanthes* root is the most highly prized medicinal plant of the district and is used as a stomachic bitter and tonic. The *Stellaria* herb is used as a poultice for inflamed or suppurating breasts, and is prepared by bruising the herb between stones that have been heated and then cooled (in a manner calculated to exclude contaminating bacteria, though the native people have no scientific knowledge of sterilization).—*E. N. Gathercoal.*

839. PLENDERLEITH, J. W. **Precipitation of alkaloids by liquorice.** Pharm. Jour. 102: 236. 1919.—Liquid extract or infusion of liquorice precipitates the alkaloid from aqueous solutions of strychnine or quinine hydrochloride by double decomposition occurring between the potassium and calcium glycyrrhizinates of liquorice and the alkaloidal salt. The chlorides of morphine, codeine and heroine cause no precipitate with liquorice infusion but tincture of opium does, possibly on account of free meconic acid. Nor did atropine sulphate, codeine

sulphate or caffeine alkaloid produce a precipitate. However, tincture of digitalis and tincture of strophanthus, in aqueous mixture, each gave slight precipitates, due possibly to free organic acids.—Quantitatively, two volumes of cold infusion of liquorice, British Pharm. will completely precipitate all of the alkaloid in one volume of 1 per cent solution of strychnine hydrochloride.—*E. N. Gathercoal.*

840. Shinbo, Ippo. **Beiträge zur Kenntniss einiger einheimischen Pflanzengallen in Japan.** [Some Japanese plant galls.] Bot. Mag. Tôkyô 33: 1–12. *3 fig.* 1919.—See Bot. Absts. 3, Entry 787.

SOIL SCIENCE

J. J. Skinner, *Editor*

841. Anonymous. **Field experiments, 1918.** Jour. Dept. Agric. Ireland 19: 180–208. 1919.

842. Anonymous. **Standardized fertilizer analyses.** Amer. Fertilizer 50: 33–36. 1919. —The Soil Improvement Committee has recommended certain standardized fertilizer analyses to be used in connection with the following crops; staple and fodder crops, vegetables, fruits and fertilizers for use in special cases. The percentage of phosphorus, nitrogen and potash to be used in connection with a given soil type are given. An effort is being made to standardize all fertilizers sold.—*F. M. Schertz.*

843. Anonymous. **Poultry manure.** Jour. Dept. Agric. Victoria 17: 157. 1919.—Poultry manure should not be used fresh owing to its burning tendency. Better results are secured when dried and stored. Liquid manure is made from it by mixing equal parts with soot, and then using 2 ounces of the mixture to a gallon of water.—*J. J. Skinner.*

844. Anonymous. **Results of wheat varieties and manurial trials.—Season 1918-19. I, II** Jour. Dept. Agric. Victoria 17: 158–163, 217–221. 1919.—Twelve varieties of wheat were tested in one half acre plots. The new crossbred, Gallipoli, produced largest yield, 41 bushels per acre. The Selected Federation was next. Glencope produced smallest yield. Fertilizer experiments at Longerenong showed that superphosphate used in amounts of 200 pounds per acre produced larger yields than did basic slag, nitrogen fertilizers, lime or manure. The best plot produced 44 bushels per acre. At Warracknabeal 150 pounds of superphosphate produced 25 bushels per acre, this yield being better than that produced by a complete fertilizer, or phosphate with lime. As small amounts as 30 pounds of superphosphate gave good returns in the New Mallee Areas. Experiments were conducted that data might be secured on early and late sowing.—*J. J. Skinner.*

845. Bell, H. G. **The fertilizer situation for 1919.** Potato Mag. 1^8: 5, 23, 28. 1919.—Potato fertilizers discussed. [See Bot. Absts. 3, Entry 460.]—*Donald Folsom.*

846. Bobilliard, J. **The flax industry.** Jour. Dept. Agric. Victoria 17: 222–230. *Pl. 10.* 1919.—See Bot. Absts. 3, Entry 462.

847. Brittlebank, C. C. **Tomato diseases.** Jour. Dept. Agric. Victoria 17: 231–235. 1919.—See Bot. Absts. 3, Entry 746.

848. Brittlebank, Charles C. **Green manurial crops and "take all."** Jour. Dept. Agric. Victoria 17: 171–173. 1919.—The disease "take all" (*Ophiobolus graminis*) has developed to a serious extent in the fertilizer plots at the Werribee Research Farm. In each plot where lime was used the disease is present to a greater extent, which seems to indicate that an alkaline soil favors the production of the fungus. The plowing under of green crops favors the development of the disease.—*J. J. Skinner.*

849. BURGESS, P. S. **Can we predict probable fertility from soil biological data?** Soil Science 6: 449–461. 1918.—Nine Hawaiian surface soils which had been under sugar cane cultivation for many years and which differed in fertility were tested for ammonification, nitrification, total supplied organic nitrogen rendered water soluble and nitrogen fixation. Incubation periods of 10, 20, and 30 days were used and dried blood, alfalfa meal, and fish scrap were employed. With 2 per cent of the organic materials in 50 grams of soil, ammonia production was generally greater in very good soils and less in very poor soils. Exceptions are noted and the conclusion is drawn that ammonification tests are not suitable for determining the fertility of average Hawaiian soils. Using 30 mgm. of nitrogen as dried blood in 100 grams of soil and a 30-day incubation period at 28°C., a good correlation was found between the nitrates produced and the crop-producing power of the soil. A close correlation was also found between the amounts of nitrogen fixed in mannite solution cultures and the known fertility of the soils studied.—*William J. Robbins.*

850. CONN, H. J., AND J. W. BRIGHT. **Ammonification of manure in soil.** Jour. Agric. Res. 16: 313–350. 1919.—A foreword by Conn refers largely to previous studies of spore-formers and non-spore-formers. Under the title, "What soil organisms take part in ammonification of manure?" Bright shows the predominance of *Pseudomonas florescens* and *Pseudomonas caudatus* in manured soil and gives the results of an investigation of their function in Dunkirk silt clay loam.—Fresh horse or cow manure was added to the soil in the ratio of 1:20. In addition to plate counts, direct microscopic examinations were made. Not only was the unsterilized material used but also the sterilized to which was added the pure cultures. The latter were used both separately and in combination.—In unsterilized soil which was kept in pots the data show a rapid increase in non-spore-formers. After 7 days they were never less than 92.5 per cent while in certain cases they were as high as 97 per cent. The results from experiments conducted in flasks are not so striking yet the same relation holds. Isolations showed only 2.8 per cent which form spores.—The growth of *Ps. fluorescens* and *Ps. caudatus* in sterilized, manured soil compared with that of a spore former, *Bacillus cereus*, shows that spore-former had increased in 7 days only 8.3 times while the two former organisms had increased respectively 110 and 132 times over the original inoculation.

851. FISHER, M. L. **The washed lands of Indiana: a preliminary study.** Indiana (Purdue) Agric. Exp. Sta. Circ. 90. 24 *p., fig.* 1–18. 1919.—See Bot. Absts. 3, Entry 467.

852. GLADWIN, F. E. **A test of commercial fertilizers for grapes.** New York Agric. Exp. Sta. [Geneva] Bull. *458:* 27–43. 1919.

853. HOWARD, L. B. **Relation of lime requirements of soils to their retention of ammonia.** Soil Science 6: 405–411. 1918.—A method is described of determining the lime requirements of soils by treating them with ammonium hydroxide. To 25 grams of soil in an evaporating dish 50 cc. of 0.2 N ammonium hydroxide is added. The mixture is stirred occasionally during a period of 1 hour. The solution is evaporated to dryness on a water bath. The soil is rubbed up with a pestle and allowed to remain on the bath for $1\frac{1}{2}$ hours. The ammonia is then determined by the aeration method. Blank determinations are made on each soil. The lime requirement found by the above method was about 25 per cent less than that found by the Veitch method, and agreed in general with field observations regarding the need of lime by the soils studied.—*William J. Robbins.*

854. JOHNSON, JAMES. **The influence of heated soils on seed germination and plant growth.** Soil Science 7: 1–103. *Pl. 1–8.* 1919.—Seven soils were subjected to dry or moist heat under varying conditions and their action on various seeds and plants determined. On heating soil to different temperatures it was usually found that the toxicity to seed germination and to early plant growth increased to a maximum at approximately 250°C. and decreased to practically nothing in soils heated to 350°C. or above. The growth of fungi on the heated soil, ammonia content of the heated soil, and concentration of the soil solution were correlated with the toxicity to seed germination. No correlation, however, was found between the

above when different soils were compared. The toxic effect of the heated soils was found to vary with the species of plants. Measured by seed germination the Graminiae and Cucurbitaceae were found to be resistant to the toxic effect while the Leguminoseae and Solanaceae were more susceptible. Soils toxic to the growth of tomatoes were beneficial to the growth of wheat. The toxic principle is formed from the organic matter of the soil, is volatile, is destroyed by the soil flora and is believed to be largely ammonia. All the toxic properties in heated soils are not, however, believed to be the same. The time required for recovery from the toxic action is generally proportional to the intensity of the toxicity produced. It disappears more slowly at low soil temperatures (below about 25°C.). The beneficial action is often greatest on soils exhibiting the greatest injurious action to early plant growth. The beneficial action is believed to be largely due to the ammonia liberated on heating.—*William J. Robbins.*

855. Johnson, James, and R. E. Hartman. **Influence of soil temperature on the root-rot of tobacco.** Jour. Agric. Res. 17: 41–86. *Pl. 1–8.* 1919.—See Bot. Absts. 3, Entry 772.

856. Jordan, W. H. **Director's report for 1918.** New York Agric. Exp. Sta. [Geneva] Bull. 457. *25 p.* 1918.—A discussion of administrative matters, brief summaries of the publications and activities of the several departments of the Station during the year, and certain proposals as to future work.—*F. C. Stewart.*

857. Landis, W. D. **The war and the nitrogen industry.** Amer. Fertilizer 50: 38–41. 1919.—A review of the development of the nitrogen industry and a discussion of the present situation.—*J. J. Skinner.*

858. Lipman, C. B. **Further studies on the distribution and activities of certain groups of bacteria in California soil columns.** Univ. California Publ. (Agric. Sci.) 4: 113–120. 1919.—Studies on ammonification, nitrification, and nitrogen fixation in the first 6 feet of soils from ten different localities. It appears that the microörganisms of arid soils penetrate deeply into the subsoil layers. The ammonifying powers continue undiminished through 6 feet of soil. The nitrifying powers existed in all soil samples, but were less at the lower levels of some soils. The nitrogen fixation results were for the most part inconclusive.—*H. S. Reed.*

859. McCall, A. G., J. B. S. Norton, and P. E. Richards. **Abnormal stem growth of soybeans in sand cultures with Shive's three-salt nutrient solution.** Soil Science 6: 479–481. *Pl. 1, 2.* 1918.—The writers report injury to soybeans grown in sand cultures watered with a nutrient solution consisting of calcium nitrate, monopotassium phosphate and magnesium sulfate with a trace of ferric phosphate. The injury consists of thickened stems and a characteristic injury to the leaves. Since this injury was found in cultures grown in solutions of varying salt proportions it would appear to be due to some property common to all of the Shive 3-salt solutions.—*William J. Robbins.*

860. Mullett, H. A. **Minyip crop and fallow competition.** Jour. Dept. Agric. Victoria 17: 65–75. *Fig. 7.* 1919.—A report of the Judge of the Crop and Fallow Competition at Minyip for 1918. On the question of fertilization it is brought out that superphosphate used at the rate of 100 pounds per acre on the black soils of Wimmera produces good crop increase, and is profitable. Summer fallowing is shown to be profitable.—*J. J. Skinner.*

861. Mullett, H. A. **Nhill farm competition.** Jour. Dept. Agric. Victoria 17: 129–144. *Fig. 7.* 1919.—Report for 1918 of agricultural condition of the community and improvement of soil conditions.—*J. J. Skinner.*

862. Mullett, H. A. **Garoke crop and fallow competition, 1918.** Jour. Dept. Agric. Victoria 17: 193–206. *Fig. 7.* 1919.—Conditions for wheat growing on the different soil types of the area are discussed. The soil types divide into silty, heavy clay, and light classes. The best crop of the Penny variety was grown on friable black loam, using 60 pounds of superphosphate per acre. Methods of cultivation are discussed.—*J. J. Skinner.*

863. PICKETT, B. S. **Some soil treatments for mature apple orchards.** Illinois Agric. Exp. Sta. Circ. 233. *6 p., fig. 1–3.* 1919.—See Bot. Absts. 3, Entry 686.

864. SINGH, T. M. **Toxicity of "alkali" salts.** Soil Science 6: 463–477. 1918.—The effect in soil cultures of sodium chloride, sodium nitrate, sodium carbonate and sodium sulfate, singly and in combinations, as found in field soils by analysis, on the growth of peas and wheat, is reported. The determination of the effect of the above salts on ammonification, nitrification, and nitrogen fixation in the soil was also made. NaCl was found most toxic followed by $NaNO_3$, Na_2CO_3 and Na_2SO_4. Stimulation of crop growth and bacterial activities was noted in some cases.—*William J. Robbins.*

865. SKINNER, J. J., AND F. R. REID. **The influence of phosphates on the action of alpha-crotonic acid on plants.** Amer. Jour. Bot. 6: 167–180. *Fig. 1–9.* 1919.

866. SNYDER, R. S., AND R. S. POTTER. **Soluble non-protein nitrogen in the soil.** Soil Science 6: 441–448. 1918.—The object of this paper is to report improvements in a method for determining soluble non-protein nitrogen of the soil and some results obtained with the refined method on the soils used by Stephenson in pot experiments. The soluble non-protein nitrogen was found to consist of nitrates, ammonia and unknown soluble non-protein nitrogen. The unknown was usually decreased by lime but was increased by lime in a sandy loam where casein, albumin, and dried blood were used.—*William J. Robbins.*

867. STEPHENSON, R. E. **Effect of organic matter on soil reaction.** Soil Science 6: 413–439. 1918.—Using carbohydrate and organic nitrogenous material at the rate of 10 tons per acre and ammonium sulfate at the rate of 1 ton per acre, pot experiments were carried out with a humous acid soil and with a sandy acid soil under lime and no lime conditions. Determinations were made of ammonia production, nitrate formation, lime requirement and residual carbonates after 2, 5, 10 and 15 weeks. None of the organic treatments increased the lime requirement of the soils as determined by the Tacke method. The highly nitrogenous materials had the effect of decreasing the acidity especially at the first sampling. The carbohydrates had a small and inconsistent effect upon the soil reaction and little or no effect upon the carbonates. Ammonium sulfate caused a marked increase in the lime requirement of both soils and exhausted the carbonates. Ammonification was greater in the absence of lime in both soils. Ammonia did not accumulate in the presence of carbohydrates or alfalfa. Nitrification occurred more rapidly in the presence of lime. No nitrates were found in the presence of carbohydrates until the 4th sampling. Taking the sum of the nitrogen found as NH_3 and NO_3 there was the greater action in the presence of lime in the untreated soil, but in the absence of lime, in most cases, in the treated soils.—*William J. Robbins.*

868. STUART, WILLIAM. **Commercial potato production in Florida.** Potato Mag. 1^8: 6–8, 24–25. *Fig. 1–9.* 1919.—See Bot. Absts. 3, Entry 482.

869. WALLIS, E. **Pear growing in Victoria.** Jour. Dept. Agric. Victoria 17: 76–86, 207–216. *Pl. 16.* 1919.—History and evolution of the pear is given, and varieties are discussed.—The relation of pear growing to soil conditions is discussed. The heavy alluvial soil, except that of basaltic nature is suitable for pears.—Kieffer pears planted in deep rich soil have a tendency to promote excessive growth at the expense of fruit. The ideal sub-soil for pears should be of an open texture. Methods of breaking and preparing the soil for planting are discussed.—*J. J. Skinner.*

870. WAYNICK, D. D., AND L. T. SHARP. **Variability in soils and its significance to past and future soil investigations. II. Variations in nitrogen and carbon in field soils and their relation to the accuracy of field trials.** Univ. California Publ. (Agric. Sci.) 4: 121–139. *Fig. 1.* 1919.—Determination of the variability in 100 samples drawn at regular intervals in two apparently uniform fields to test the limits of accuracy of sampling. The extreme variations between different samples were of considerable magnitude and show that the results obtained

with one or few samples would be untrustworthy. Data are presented showing that the making of a composite sample is justified after the variations in the area are known. The advantages of estimating the number of samples necessary to secure any degree of accuracy are discussed. From such an estimation it becomes possible to sample field soils in a definite manner and to avoid needless work in securing an unnecessarily large number of samples.—*H. S. Reed.*

871. Wiancko, A. T., S. D. Conner, and S. C. Jones. **The value of legumes on Indiana soils.** Indiana (Purdue) Agric. Exp. Sta. Bull. 226. *20 p., fig. 1–6.* 1919.—See Bot. Absts. 3, Entry 488.

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ENTRIES 872-1323

AGRONOMY

C. V. PIPER, *Editor*

872. CALVINO, MARIO. **Una leguminosa forrajera interesante para Cuba. [A leguminous forage crop for Cuba.]** Revist. Agric. Com. y Trab. 2: 196–199. *6 fig.* 1919.—The "Kudzu vine," *Pueraria hirsuta* Schneider [*P. thunbergiana* (S. & Z.) Benth.], appears to do well in Cuba and produces viable seeds. A chemical analysis of the plant is given.—*F. M. Blodgett.*

873. TAYLOR, W. H. **Selection of seed potatoes.** New Zealand Jour. Agric. 18: 37–38. 1919.—It is advised that seed be selected only from high yielding hills. The hills should be lifted "when the tubers have nearly finished growing, but before the haulm begins to wither," the author asserting that immature seed produces heavier crops than seed that is fully matured.—*H. A. Jones.*

874. CALVINO, M. **La Jicama de Agua. (Pachyrhizus tuberosus.) [The Yam Bean.]** Revist. Agric. Com. y Trab. 2: 84–88. *5 fig.* 1919.—This plant which is commonly grown in Mexico for its fleshy root is recommended for Cuba. Analysis of roots and tops are given and the results of an experiment showing the necessity of removing flowers to produce roots. —*F. M. Blodgett.*

875. BARTHE, A. B. **Cultivo industrial de la higuereta. III. Perspectivas Cubanas. [Cultivation of the castor bean.]** Revist. Agric. Com. y Trab. 2: 89–96. *4 fig.* 1919.—Brief descriptions of a few varieties of castor bean tried in Cuba are given, together with estimates of cost of growing and profits.—*F. M. Blodgett.*

876. FROMME, F. D., AND S. A. WINGARD. **Bean rust: its control through the use of resistant varieties.** Virginia Agric. Exp. Sta. Bull. 220: *18 p. Pl. 1–5.* 1918 [1919].—See Bot. Absts. 3, Entry 1174.

877. COCKAYNE, A. H. **Foxglove and its control.** New Zealand Jour. Agric. 18: 28. 1919. —Foxglove (*Digitalis purpurea*) is very common in New Zealand and listed in some sections as a noxious weed. The usual method of eradication is by pulling, but more attention should be given to cleaning up those areas of land likely to produce greatest revenue. There is evidence to believe that on good grass lands this weed will disappear in a period of five to eight years without hand pulling.—*N. J. Giddings.*

878. AAMODT, A. W. **Favor three varieties.** Potato Mag. 1^{10}: 15. *1 fig.* 1919.—Reports various methods of potato growers in Minnesota.—*Donald Folsom.*

879. Anonymous. **What government market news service does.** Potato Mag. 1^{10}: 22. 1919.—Gives examples of profitable modification in potato growing methods made on basis of market news.—*Donald Folsom.*

880. Werner, H. O. **A Nebraska view of the potato grades.** Potato Mag. 1^{10}: 23. 1919. —Proposes another grade based on uniformity.—*Donald Folsom.*

881. Miller, Justus. **Northern Ontario seed potato trade.** Potato Mag. 1^{11}: 5, 33–34. 1919.—Concerns original condition of stock, importation of seed, certification, cooperation, and effect of variety, soil type, and source of seed on yield.—*Donald Folsom.*

882. Wheeler, H. J. **What potatoes need in Wisconsin.** Potato Mag. 1^{11}: 14–31. *1 fig.* 1919.

883. Macoun, W. T. **Growing potatoes in crates or pens.** Potato Mag. 1^{11}: 20. *2 fig* 1919.—Describes test which resulted in the disapproval of the method.—*Donald Folsom.*

884. Munger, H. E. **Why grade Colorado potatoes?** Potato Mag. 1^{11}: 20–21. *1 fig.* 1919. —Advocates grading on basis of greater salability.—*Donald Folsom.*

885. Bennett, E. R. **Cultural essentials in arid west.** Potato Mag. 1^{11}: 11. 1919.—Concerns chiefly the preparation of soil and application of water for potatoes.—*Donald Folsom.*

886. Hecke, G. H., J. E. Rickards, E. E. Kaufman, and R. G. Risser. **California crop distribution and estimates, 1918. A bulletin dealing with the acreage, distribution, tonnage and valuation of commercial fruit and vegetable crops in California.** Monthly Bull. Comm. Hort. California 4: 143–225. *Fig. 62–93.* 1919.

887. Essig, E. O. **Two interesting weeds. A new weed and a forage plant introduced into Ventura County.** Monthly Bull. Comm. Hort. California 2: 79. 1919.—During the summer of 1918, a new weed appeared in Ventura County, California. H. M. Hall of the University of California identified it as the hoary cress (*Lepidium draba* L.). Jepson reports it as escaping in the San Francisco Bay region and as thoroughly naturalized and filling fields in Yreka, Siskiyou County. Donald Penny reports it as a noxious weed in Santa Cruz County.—A grass, identified by P. B. Kennedy of the University of California as smilo grass (*Oryzopsis miliacea* B. & H.) has recently been introduced into Ventura County, California. In San Diego County this grass is being grown as a dry-land forage crop. The indications are that where a stand can be obtained it would be a valuable forage crop for many of the barren hills of the southern coast region of California.—*E. L. Overholser.*

888. Jobez, H. **La foret et le paturage boisé a la Société des Forestiers. [Forest and pasture as discussed by the Vaud Society of Foresters.]** Bull. Trimest. Soc. Forestiere Franche-Comte et Belfort 13: 15–18. 1919.—See Bot. Absts. 3, Entry 550.

889. McClelland, C. K. **Cotton and corn, cultural tests, and variety tests of 1917 and 1918.** Georgia Agric. Exp. Sta. Bull. 128: 63–78. Feb., 1919.—Notes on rainfall, culture, fertilization and varieties of *Gossypium herbaceum* and *Zea mays.* Four hundred pounds of fertilizer per acre proved economic for corn. Velvet beans (*Stizolobium* sp.), planted with corn at the same time usually reduced the corn yield; if planted later the reduction may or may not be important according to the growth of the beans. The value of the beans produced is always greater than the value of the corn lost. Results show that late chopping of cotton produces a slightly earlier crop than the ordinary practice of early chopping.—*T. H. McHatton.*

890. McClelland, C. K. **The velvet bean.** Georgia Agric. Exp. Sta. Bull. 129: 83–98. *Fig. 1–6.* Feb., 1919.—A short history of the introduction and origin of varieties of the Velvet Bean (*Stizolobium* sp.), also notes on culture and uses. The better known varieties discussed are Florida, Georgia or Early Speckled, Alabama or Medium Early Speckled, Chinese, Osceola, Yokohama and Lyon.—*T. H. McHatton.*

891. Anonymous. **The world supply of cereals.** New Zealand Jour. Agric. 18: 248. 1919. —Gives a survey of the situation from the standpoint of estimates and forecasts based on information supplied by Sir J. Wilson, New Zealand representative in the International Institute of Agriculture of Rome.—*E. R. Hodson.*

892. McTaggart, A. **Means for increasing agricultural production in New Zealand.** New Zealand Jour. of Agric. 18: 140. 1919.—Discusses well-known methods in their application to New Zealand conditions.—*E. R. Hodson.*

893. McTaggart, A. **Rotation of crops.** New Zealand Jour. Agric. 18: 83. 1919.—Discusses the reasons and need for rotation and its advisability for New Zealand conditions. —*E. R. Hodson.*

894. Dibble, W. **Forage crops.** New Zealand Jour. Agric. 18: 169. 1919.—Discusses the kind of crops and methods of treatment for both summer and winter forage plants. —*E. R. Hodson.*

895. Anonymous. **Estimated yield of wheat and oat crops.** New Zealand Jour. Agric. 18: 128. 1919.—Gives estimated yield of these crops for 1918–19 compiled by the Government statistician from reports furnished by the field inspectors of the Department of Agriculture. —*E. R. Hodson.*

896. Anonymous. **Lucerne experience.** New Zealand Jour. Agric. 18: 213. 1919.—The article deals with soils and localities suitable to lucerne. Among the results noted are the experiments on pumice or volcanic ash from the eruption of 1886.—*E. R. Hodson.*

897. Anonymous. **Areas under principal crops.** New Zealand Jour. Agric. 18: 58. 1919. —Gives in tabular form the areas under the principal arable crops in New Zealand at five year intervals since 1900; also tabular data on unimproved land and on tenure of occupied land.— *E. R. Hodson.*

898. Merchan, A. **Informe sobre tratamiento electrico de semillas antes de la siembra. [Electric seed treatment.]** Revist. Agric. Com. y Trab. 2: 199–201. 1919.—See Bot. Absts. 3, Entry 1251.

899. Barthe, A. E. **Cultivo industrial de la higuereta. IV. La crîa del gusano de seda del Ricino (Attacus ricini Boisdv.). [Castor bean as food for the castor silk-worm.]** Revist. Agri . Com. y Trab. 2: 161–169. *2 pl., fig. 1–8.* 1919.

900. Aston, B. C **Improvement of poor pasture.** New Zealand Jour. Agric. 18: 15–27. 1919.—After a brief review of the Cockle Park experiment, in England in 1896, on the Duke of Portland's estate near Morpeth, Northumberland, the author describes similar experiments in New Zealand where phosphorus produced considerable improvement in the carrying-capacity of the pasture. In 1917 on the Wallaceville Laboratory Farm an experiment on pasture treatment was undertaken, analyses of the soil made and seven lots laid off into five $\frac{1}{20}$-acre plots and fenced. Finely ground Makatea Island rock phosphate containing about 85 per cent tricalcic phosphate applied at the rate of 5 cwt. per acre together with 3 tons of rather coarse limestone rejections from the Mauriceville quarry, produced the greatest amount of grass, while lime alone made a marked improvement over the control lot. In 1918, after six months grazing the control lot was carrying only 8 sheep, while the paddock receiving ground Maka-

tea Island phosphate and rough unground limestone was carrying 28 sheep and paddock No. 4 rough unground limestone 13 tons per acre carrying 20. The experiment is to be continued for several years.—*I. S. Cook.*

901. Koch, George P. **The Cultivation of medicinal plants.** Western Druggist **41**: 148–151. 1919.

902. Koch, George P. **The cultivation of medicinal plants.** Jour. Amer. Pharm. Assoc. **8**: 275–281. 1919.—See Bot. Absts. 3, Entry 1685.

903. Clayton, R. J. B. **A memorandum on rice supplies.** Bull. Dept. Agric. Federated Malay States **7**: 15–27. 1919.—Rice supplies generally; the normal supply and consumption of Malaya; local rice position at present; the effect of the war on rice supplies to Malaya; rice war measures taken in four other countries; the conditions necessary for a large rice production, and rice milling locally are discussed in this article. Several deductions and recommendations relative to increased rice production for Malaya and its relation to the labor situation are given.—*J. T. Barrett.*

904. Cockayne, L. **An economic investigation of the montane tussock-grassland.** New Zealand Jour. Agric. **18**: 1–9. 1919.—A sharp division line between the dense forest on the west side of the divide of the Southern Alps and the tussock grassland on the coast side is described by the author. The rainfall ends at the forest line and the eastern grassland contains no trees. Most parts of the tussock-grassland will not pasture one sheep to three acres. The montane tussock-grassland is made up of some 210 species of indigenous plants which belong to 39 families and 98 genera. The dominant species is the fescue-tussock (*Festuca novae-zealandiae*), while the silver-tussock (*Poa caespitosa*) dominates the lowland. Methods of improving the pasture land are described, such as burning, surface sowing, and cultivation. —*I. S. Cook.*

905. Eaton, B. J. **Lalang grass as a paper material.** Bull. Dept. Agric. Federated Malay States **7**: 28–32. 1919.—The value of lalang grass, *Imperata arundinacea*, as a paper making material is compared with Spanish and Algerian esparto grass. Experiments in pulping showed lalang grass to be inferior to the Spanish but to compare favorably with the Algerian esparto grass. The investigations made indicate the need of information on available are as of raw material, especially lalang, and its cropping possibilities. A brief discussion of the world supply of paper producing materials is included.—*J. T. Barrett.*

906. Hunnicutt, B. H. **A forage plant from the Solanaceae family.** Jour. Heredity **10**: 185–187. *Fig. 14–15.* 1919.—Points out the possible value of *Solanum bullatum* and *Solanum grandiflorum*, natives of Brazil, as forage plants.—*M. J. Dorsey.*

907. Piedallu, André. **Sur le bouturage du Sorgho.** [Growing sorghum from cuttings.] Compt. Rend. Agric. France **1919**: 76–78. 1919.—By cutting canes into pieces 3 to 4 cm. long each side of a node and removing the sheath by a circular cut just above the node it was possible to grow sorghum from such cuttings. This is of advantage in multiplying desirable sorts without danger of cross pollination. The canes may be kept alive over winter if protected from the cold.—*E. A. Bessey.*

908. Ayres, W. E. **A bad farm practice.** Arkansas Agric. Exp. Sta. Circ. 47. *4 p., 1 pl.* 1919.—The deterioration in the grade of cotton due to standing in the field is given for three standard varieties. The figures show that a small crop picked early gives better financial returns than a larger crop injured by weather.—*John A. Elliott.*

909. Ayres, W. E. **Varieties of cotton.** Arkansas Agric. Exp. Sta. Bull. 159. *16 p.* 1919.—Results of tests of 109 varieties and strains in small plots; four regular tests of 25 standard varieties; and more extensive tests of 8 most promising varieties are given for the season of 1918. Fourteen tables show the comparative ranking of the varieties and strains in value of seed cotton and of lint per acre.—*John A. Elliott.*

910. AYRES, W. E. Cultural experiments with cotton. Arkansas Agric. Exp. Sta. Bull. 161. *16 p., 4 pl.* 1919.—Results in value of seed cotton per acre are given to show the returns from various methods of handling cotton. The following methods are tabulated and compared: Check-row spacing; check-row vs. ordinary spacing; thinning vs. no thinning; number of plants per hill; distance between hills; width of rows; ridge vs. level planting; dates of planting; methods of cultivation; topping. The results are given for the season of 1918. The use of the double-row cultivator with the elimination of three-fourths of man labor gave promising results.—*John A. Elliott.*

911. TAYLOR, W. H. Bees and flower fertilization. New Zealand Jour. Agric. 18: 203. 1919.—Discusses the subject with reference to beans and peas.—*E. R. Hodson.*

912. KAJANUS, BIRGER. Über eine Kreuzung zwischen zwei Typen von Sommerweizen. [On the crossing of two types of spring-wheat.] Bot. Notiser 1918: 245–247. 1918.—See Bot. Absts. 3, Entry 1007.

913. WERNER, H. O. Grading legislation in Nebraska. Potato Mag. 1^{12}: 24. 1919.—Describes bill which compels grading of potatoes produced in Nebraska.—*Donald Folsom.*

914. PROBASCO, C. B. Suggestions on marketing potatoes. Potato Mag. 1^{12}: 11, 24. 1919.—Advocates fixed standards, growers' associations, and establishment of demand for specially marked packages.—*Donald Folsom.*

915. WHEELER, H. J. Fertilizers stimulate production in Maine. Potato Mag. 1^{12}: 30. *1 fig.* 1919.

916. CLINTON, G. P. Prematuring and wilting of potatoes. Potato Mag. 1^{12}: 12–13, 24. 1919.—See Bot. Absts. 3, Entry 1162.

917. SANBORN, C. B. Oklahoma and certified seed. Potato Mag. 1^{12}: 23. 1919.

918. MURPHY, P. A. Seed potato inspection service in Canada. Potato Mag. 1^{10}: 8, 28, 31. *7 fig.* 1919.—Describes methods and effects of inspection.—*Donald Folsom.*

919. BARRUS, M. F. Seed improvement and certification. Potato Mag. 1^{10}: 10, 25, 34. *1 fig.* 1919.—Discusses scope, methods, and results in the United States.—*Donald Folsom.*

920. CLARK, C. F. The potato industry in Colorado. Potato Mag. 1^{11}: 8–9, 22; 1^{12}: 14–15, 29. *8 fig.* 1919.—Describes the various districts, the importance of the crop, variety choices, range of soils, rotation and other cultural methods, storage, pests and diseases.—*Donald Folsom.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

921. FAIRCHILD, DAVID. Present condition and opportunity of the American Genetic Association. Jour. Heredity 10: 65–67. 1919.—See Bot. Absts. 3, Entry 994.

922. WAKEMAN, NELLIE. Teaching plant chemistry. Jour. Amer. Pharm. Assoc. 8: 105–108. 1919.—Three lines of thought are presented, (1) the value of the subject; (2) materials for study; and (3) methods of presenting the subject. The paper deals with the methods of teaching plant chemistry at the University of Wisconsin.—*Anton Hogstad, Jr.*

923. TANSLEY, A. G. The reconstruction of elementary botanical teaching. New Phytol. 18: 108–110. 1919.—The editor closes the discussion begun in December, 1917. "The suggestion that the syllabus of an elementary course, on the lines indicated in the memorandum, should be drawn up and published has been made from several quarters. In accordance

with this suggestion a meeting of botanists known to be in sympathy with the ideas of the memorandum was held in London in January, and a small committee was appointed to compile such a syllabus."—*I. F. Lewis.*

924. Lantes, Adelaida. **Como se prepara un herbario. [How to prepare an herbarium.]** Revist. Agric. Com. y Trab. 2: 285. *1 fig.* 1919.

925. King, Cyrus A. **Changes in teaching botany in our high schools.** Torreya 19: 65–71. 1919.—The present curriculum practically cuts off the bright pupils from taking botany. Insufficient time is given for the development of fundamental principles. The course should be more definitely organized. It should be made to assist in a better comprehension of life-processes, of the relation of biology to human welfare, and in developing citizenship. This can be better accomplished in the study of biology than in general science.—*J. C. Nelson.*

926. Mann, Paul B. **The relation of first-year botany to advanced work, with references to certain applications and by-products.** Torreya 19: 72–78. 1919.—The contributions of first-year botany to advanced courses and later life are: (1) In offering an approach to rational sex-hygiene; (2) As a basis for general hygiene; (3) Working material for individual culture; (4) To insure intelligent citizenship; (5) To discover latent scientific talent.—*J. C. Nelson.*

927. Hughes, Francis T. **Botany in the city high schools.** Torreya 19: 57–65. 1919.—High-school botany is suffering from prejudice and the competition of other subjects. The solution is not hopeless if the subject is properly vitalized. We should teach botany from the pupil's environment. One complete object should be used as a starting-point. The tree is the most familiar and accessible object for the city pupil, and can be used to illustrate all the vital processes.—*J. C. Nelson.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

928. Adkin, B. W. **Some very injurious beetles.** Quart Jour. Forest. 13: 45–49. 1919. —Pine weevils, particularly the large brown pine weevil (*Hylobius abietis*, L.), which devours the bark on the stems of young coniferous trees, and the pine beetle (*Myelophilus piniperda*, L.), which destroys the branches of pines, are generally regarded as being the most injurious beetles of coniferous woods and plantations in Great Britain. There are other injurious beetles which though not generally regarded as injurious are in fact quite as much so. These belong to the genus *Hylastes* and include five known British species; two of these are very rare, and may be disregarded; two others, *H. ater*, *Payk.*, and *H. palliatus*, Er., are very common. The third species, *H. cunicularius*, *Gyll.*, is said not to be common, but still has been proven quite so in Scotland. These three beetles are not much larger than one of the common ants. They spend their lives in places where but little is seen of them. The larvae of the first named feed under the bark of the roots of Scotch pine trees which have been recently felled, or which are dead or in sickly condition. The larvae of the second named feed under the bark of the roots of spruce trees. The larvae of the third feed under the bark of Scotch pine and also less frequently of spruce and larch.—*C. R. Tillotson.*

929. Anonymous. **Annual report of the forest department of the Union of South Africa for year ending March 31, 1918.** *43 p.* Cape Town, 1918.—This is the annual administrative report of the Department and covers a wide range of subjects in summarized form. The influence of the war is shown in bringing the urgency of the forest problem to public attention. It is pointed out that not much more than 5 per cent of the probable future requirements of the country for softwood (which comprises 90 per cent of the consumption) can be supplied even with the forests in a high state of productivity. Planting must therefore be undertaken on an extensive scale to make up the deficiency. It is planned to plant a total area of 300,000 acres and an additional fund of £50,000 was appropriated in 1918, to get the enlarged program under way.—*E. R. Hodson.*

930. Anonymous. **Casuarina woods in Mauritius.** Agric. News [Barbados] 18: 5. Feb. 22, 1919.—This article consists of extracts from a letter of H. A. Tempany, Director of Agriculture, Mauritius. *Casuarina equisetifolia* L., locally known as "Filao," is extensively planted along the sea coast of Mauritius on the "Domaine publique" which consists of all of the land along the coast to a minimum depth of 81 metres. The trees form a useful shelter belt and produce a valuable supply of fuel. In the shade of the trees the West Indian grass (*Stenotaphrum glabrum* Trin.) known locally as "herbe bourrique" grows luxuriantly and is utilized for cattle pasturage.—*C. V. Piper.*

931. Anonymous. **Garden, field and forest.** Jour. Bd. Agric. British Guiana 12: 37–44. 1919.—Descriptions and uses of the saman tree (*Pithecolobium saman*) and the cannon ball tree (*Couripita guianensis*).—*J. B. Rorer.*

932. Anonymous. [W. N. Sands.] **The Mahoe cockon tree in relation to cotton stainer control in St. Vincent.** Agric. News [Barbados] 18: 154–155. May 17, 1919.—The "Mahoe cockon" tree (*Sterculia caribaea* R. Br.) a breeding plant of the cotton stainer (*Dysdercus delauneyi* Leth.) is discussed with reference to the control of the insect.—*C. V. Piper.*

933. Anonymous. [M., J. M.] **A note on planting and sowing.** Trans. Roy. Scottish Arboric. Soc. 33: 88–90. 1919.—This article takes up briefly the considerations which should govern the choice of sowing or planting in reforestation or afforestation operations.—*C. R. Tillotson.*

934. Anonymous. **Om gjeita og skogen. [Goat grazing and the forest.]** Tidsskr. Skogbruk 27: 74–75. Mar.–Apr., 1919.—The goat is a common domestic animal on Norwegian mountain farms. If the animal is starved in winter it will devour large quantities of spruce and pine buds and new shoots when let out. Sometimes it gnaws the bark as well. The greatest damage is done by eating all the one-year seedlings it comes across. This is the choice dish and it does not pass them by if ever so full.—*J. A. Larsen.*

935. Beeson, C. F. C. **Food plants of [British] Indian forest insects. Part I.** Indian Forester 45: 49–56. 1919.—An annotated list of Coleopterous species from India, of which the food-plants are known, with their distribution and feeding habits. The present paper lists 30 species with 89 records of host plants.—*E. N. Munns.*

936. Beeson, C. F. C. **Forest Insect conditions in Gorakhpur Division [British india].** Indian Forester 45: 10–15. 1919.—A description is given of the borers, defoliators and insects destructive to young growth.—*E. N. Munns.*

937. Bell, Francis. **A forestry policy for New Zealand: Address by the Commissioner of State Forests.** New Zealand Jour. Agric. 18: 313–318. 1919.—This office, recently separated from that of the Minister of Lands and not yet made a department, does not deal with private forest land although this may become part of its future work, especially in the purchase of private lands for state forests. It is advocated that sawmills be granted licenses only on the condition that no timber sawed at their mills shall be sold for export. Approximately 1,654,214 acres are in state forests of which 1,464,000 acres are actually under forest. These state forests include only lands so proclaimed under the State Forests Act. There is an urgent problem in Crown lands not yet proclaimed State forests because of the present demand for land for settlement. In accordance with the present policy where such land is good agricultural land it will not be withheld from clearing when needed by settlers. It has not yet been found possible to classify the forest and agricultural land but a system of proclaiming provisional State forests is being followed which it is hoped will prevent hasty action in settling land better adapted to forest purposes than to cultivation.—The commissioner has power to protect the forest-covered watersheds of streams to prevent floods in those non-navigable and to conserve a constant flow in those which are navigable. Regulations have limited the export of certain classes of timber and power has been taken to fix the prices of every class of milled timber in New Zealand. The sale of standing timber is prohibited, or

the grant of licenses to cut standing timber without the consent of the Governor-General in Council. These regulations, however, do not prevent any private owner from cutting or destroying the timber on his own land. There are two important administrative matters (1) the conservation of existing forest areas and (2) the planting of poor land now bare of forest. A recent act has given the power to raise £200,000 for afforestation purposes, none of which has yet been used. *Pinus insignis* is perhaps the most profitable species but may have to yield first place to Douglas fir. Kauri is valuable, as it grows on poor land. White pine is a valuable species but will disappear in time, as it grows only on land needed for cultivation. A report by D. E. Hutchins on New Zealand forests, is mentioned as about to be published.—*E. R. Hodson.*

938. Berzelius, Jacob. **Om dyrkning af pil. [Willow culture.]** Tidsskr. Skogbruk **27**: 58–65. Mar.–Apr., 1919. [Translation from Skogen, Swedish.]—Willows grown on wet ground generally produce coarse, brash wood with much pith. A finer quality of wood and more flexible reeds result when grown on drier ground. Good sites for willow culture are medium deep, moss or grass swamps, ditched if too wet. Even pure sand, somewhat firm, when not overlying gravel can be used. The presence of phosphoric acid and a small amount of potash is beneficial. Frosty sites should be avoided. The sod should be broken 40 to 50 cm. deep in fall, fertilized by mixing 300 kgm. of Thomas-phosphate and 700 kgm. of 37 per cent potash per hectare. On distinctly poor ground use 700 kgm. Chili saltpeter per hectare as dressing after the appearance of new vegetation. Cuttings should be secured in December or January, bundled and stored protected from drying out. Before setting out discard 40 cm. of the top and about 4 cm. of the bottom.—*J. A. Larsen.*

939. Boerker, R. H. D. [Rev. of: Griffin, A. A. **Influence of forests upon the melting of snow in the Cascade range.** Monthly Weather Rev. **46**: 324–327. *3 fig., 4 tab.* 1918.] Jour. Forestry **17**: 47–50. 1919.—Studies in the United States in the last five years show that forests retain snow between two to three weeks after the snow in the open has disappeared, and that the snow waters are better absorbed in the soil under forest conditions than out in the open. Further studies are urged for the benefit of the irrigation interests, engineers and foresters that the public may better understand the forest relationships.—*E. N. Munns.*

940. Boyd, J. **Nectria cinnabarina as a parasite.** Quart. Jour. Forest. **13**: 139. 1919.—See Bot. Absts. 3, Entry 1626.

941. Brown, W. Bruce. **Transport in relation to afforestation.** Quart. Jour. Forest. **13**: 93. 1919.—Discusses modes of transporting logs in logging operations.—*C. R. Tillotson.*

942. Deam, Charles C. **Trees of Indiana.** Indiana State Bd. Forestry Bull. **3**. *299 p., 133 pl.* 1919.—A revised edition of the 1911 report of the State Board of Forestry, with corrections, additional notes and a new introductory chapter. Practically all the botanical drawings in the bulletin were made from the author's private herbarium of trees native to Indiana. He has carried on field investigations on tree distribution in the State during the last fifteen years. The bulletin is of especial value to those interested in the authentic distribution of trees in the United States, as it indicates all counties in the State in which each species occurs. All publications bearing on the distribution of trees in Indiana were consulted, but the author has used his field knowledge of the State in judging the correctness of all reported occurrences of the different species. In the introductory part is given a list and critical discussion of trees reported by various authorities as occurring in the State, but which the author is convinced do not occur at the present time, or never did occur as native. The list of species given as not occurring includes *Pinus rigida, Chamaecyparis thyoides, Populus balsamifera, Hicoria aquatica, H. myristicaeformis, Castanea pumila, Quercus illicifolia, Q. nigra, Q. phellos, Planera aquatica, Ilex opaca, Acer pennsylvanica, Nyssa aquatica, Halesia diptera* and *Fraxinus caroliniana.*—The bulletin contains keys to families, genera and species. For each species a plate shows leaves, twigs and fruit, and a discussion is added about distinguishing botanical characters, importance, and range of the tree in the United States and

Indiana, size and frequency of occurrence, distribution by counties in the State, the economic uses and horticultural value, and, in some cases, the best methods of planting.—There is also an interesting table of measurements on largest trees of some species occurring in the State. The author is preparing a book on the trees of Indiana.—*W. D. Sterrett.*

943. Eldevik, Sören. **Löner det seg aa plante skog? [Does it pay to plant trees?]** Tidsskr. Skogbruk 27: 70–71. Mar.–Apr., 1919.—A plantation, made 1897–1900, now consisting of 1500 trees [evidently Norway spruce and Scotch pine], has yielded 5 per cent interest.—*J. A. Larsen.*

944. Fernow, B. E. [Rev. of: Anonymous. **Report on white pine blister rust control, 1918.** American Plant Pest Committee Bull. 2. *16 p.* Boston, 1919.] Jour. Forestry 17: 325–326. 1919.—See Bot. Absts. 3, Entry 532.

945. Frith, W. E. **Result of felling on the Quinta Estate.** Quart. Jour. Forest. 13: 140–141. 1919.—A short article giving the size and yield of eighty-year old trees of silver fir, spruce, Scotch pine and larch, which were felled on this estate.—*C. R. Tillotson.*

946. Grant, James. **The destruction of young plantations by squirrels.** Trans. Roy. Scottish Arboric. Soc. 33: 88. 1919.—A short letter calling attention to the damage by squirrels to young plantations after the older trees that were their accustomed place of refuge had been felled.—*C. R. Tillotson.*

947. Greyerz, H. von. **Das hagel-, Ton-oder Mändliholz. [The identification of the spruce (Picea excelsa, Lk.).]** Schweiz. Zeitschr. Forstwesen 70: 86–89. 1919.—The great demand for forest products during the war led to a much closer utilization of inferior material than heretofore. In handling this material definite characteristics were noted in regard to the wood markings and structures. Wood from the Horn state forest showed an outer structure that was crenate. The notches were 0.5 to 2 mm. deep and 1 to 3 mm. long, arranged on the stem similarly to the cell structure on the interior. This crenate formation was never found at the center of the stem, nor in trees under 40 cm. in diameter breast high. The formation is always directly correlated with the medullary rays. In cross examination this crenate formation can be very distinctly noted in the annual rings, which show a wavy arrangement.—The technical properties of the spruce are more pronounced at higher elevations than at lower ones, although in other species the stunted growth and increased number of branches at higher altitudes decrease the technical value. No definite information was noted for the different exposures.—This article is illustrated by microscopic photographs of cross, tangential and longitudinal sections. Also the crenate formations on the outside are illustrated.—*J. V. Hofmann.*

948. Haslund, Ove. **Bestandskarter, arbeidskarter. [Stand maps.]** Tidsskr. Skogbruk 27: 56–58. Mar.–Apr., 1919.—The author describes a convenient, but rough, method of mapping and tabulating stands for field use.—*J. A. Larsen.*

949. Heilberg, G. F. **Hassel-töndebaand. [Hazel hoops for cooperage.]** Tidsskr. Skogbruk 27: 65–67. Mar.–Apr., 1919.—Hazel sprouts of suitable sizes so as to allow splitting in two parts are extensively used for slack cooperage. Willows are also used but are not as good as hazel.—*J. A. Larsen.*

950. Hopkinson, H. D. **A note on the re-sowing of the pine areas in the forests of Brotonne and Rouvray.** Trans. Roy. Scottish Arboric. Soc. 33: 69–70. 1919.—This is a short account of a sowing operation on a large area clear-cut by the British army during the war.—*C. R. Tillotson.*

951. Judd, C. S. **Report of the Superintendent of Forestry, Division of Forestry.** Bd. Commissioners Agric. and For. Territory of Hawaii Rept. 1917–1918: 19–42. *Pl. 2–5, maps 1–5.* 1919.—This report covers the biennial period ending December 31, 1918. The main ac-

tivities of the Division were confined to protection and extension. The compelling reason for the practice of forestry in the Hawaiian Islands is the maintenance by forest influences of a steady supply of water for agriculture and domestic uses. The protection and rehibilitation of the forest, therefore, for its effect upon the water supply, rather than the exploitation of the forest for timber, have been the ends sought. The report sets out the details of this work; five maps showing the Forest Reserves of the islands add to its value.—*Stanley Coulter.*

952. Knuchel, H. **Ergebnis der Bucheln- und Eicheln-Ernte vom Jahre 1918 im Kanton Schaffhausen. [The yield of beech nuts and acorns, 1918, in the Canton Schaffhausen.]** Schweiz. Zeitschr. Forstwesen 70: 86–89. 1919.—On September 5, 1918, the Swiss Domestic Department formed an agreement with the Department of the Interior to stock land with fruit and other forest trees. Arrangements were made to gather the fruit by school children or people of the local community.—The crop of acorns and nuts was very heavy and afforded employment for a large number of families in the forest communities. 25 centimes per kilogram was paid for gathering the acorns, and 1.10 francs per kilogram for beech nuts. A central organization took care of all the nuts as they were gathered. On the whole, the arrangement proved very satisfactory.—*J. V. Hofmann.*

953. Leslie, A. S. **Note on the planting of poplars at Kininvie.** Trans. Roy. Scottish Arboric. Soc. 33: 71–77. 1919.—This article discusses several kinds of poplar which are supposedly suitable for planting at Kininvie, the methods to be followed in planting and the rates of growth of the several species.—*C. R. Tillotson.*

954. Lie, Haakon. **Den store ulvetiden. [The great wolf years.]** Tidsskr. Skogbruk 27: 71–74. Mar.–Apr., 1919.—For several years after the Russian campaigns of Napoléon I, Norway seemed overrun by hordes of ravenous wolves. It is supposed that the wolves increased in numbers by feeding on the remains of the soldiers and when food gave out were forced to roam elsewhere. No bearing on their influence on the forests is stated, but rather an exciting account of how half a dozen animals attacked a man on a sled, who saved himself by inverting and crawling under a wine trough which he was hauling home.—*J. A. Larsen.*

955. Mangin, Vincey, Haller, and Henneguy. **Le dépérissement des Épicéas dans la vallée de l'Arve (Chedde et Chamoniz). [Discussion on death of spruces in the Arve valley.]** Compt. Rend. Acad. Agric. France 1919: 113–115. 1919.—See Bot. Absts. 3, Entry 1179.

956. Maw, P. Trentham. **Government afforestation proposals.** Quart. Jour. Forest. 13: 97–100. 1919.—Comments upon the final report of the Forestry Sub-committee of the Forestry Reconstruction Committee, 1918, with suggestions to land owners concerning the leasing of their lands.—*C. R. Tillotson.*

957. Milne Home, J. H. **Preventive methods against attacks of the pine weevil.** Trans. Roy. Scottish Arboric. Soc. 33: 81–82. 1919.—While other methods of protection against the pine weevil are often employed, the peeling of stumps which form the breeding-ground for the larvae of the weevil seldom receives attention. On two felling areas of 40 and 25 acres, respectively (places in Scotland), where there was reason to fear a serious attack on young plants that had been set out, the precaution was taken in the months of May and April, 1918, to strip the bark from the stumps of both Scotch pine and spruce. Very large numbers of larvae were found; many thousands being taken out and killed on the two areas. The damage done by weevils during the succeeding several months was negligible; the pest being entirely under control.—*C. R. Tillotson.*

958. Murray, A. **Nature as the forester's guide.** Trans. Roy. Scottish Arboric. Soc. 33: 59–63. 1919.—It is seldom that the practical forester or tree planter is capable of making a chemical analysis of the soil. Even if possible, it is doubtful if such an examination would form a reliable guide of the proper distribution of forest trees. The practical planter could, however, through observation of the natural existing vegetation, come to have an understand-

ing of the character and quality of the underlying soil. This, in connection with a knowledge of the requirements of the various species to be planted, will enable the forester to plant only those species which will find the soil and situation congenial to their growth. In Scotland, soils growing heather will generally be found most suitable for the growing of the Scotch pine. When, however, there are mixtures with other plants, such as *Potentilla tormentilla, Holcus lanatus*, several varieties of trees may succeed very well. The size of the plants will, moreover, form a guide as to the fertility of the soil. Foxglove indicates a medium soil, inclined to be dry, and a great variety of trees may be grown in soil on which it flourishes. The most hopeless soil in its natural condition is that covered with species of *Scirpus*. Unless thoroughly drained, it is vain to expect any kind of tree to succeed on it.—*C. R. Tillotson.*

959. Pearson, G. A. [Rev. of: Anonymous. **Meddelanden från Statens Skogsförsöksanstalt. [Contribution from the Swedish State Forest Experiment Station.]** Häfte 15. *288 p.* Stockholm, 1918.] Jour. Forestry **17**: 431–436. 1919.—Seven papers are included with the administrative report, which deal with storm, insect and disease damage, tree-seed studies, direct seeding, and mensuration studies. The investigative program for 1918–1920 includes problems in forest regeneration, development of forest stands, studies in diseases and injuries, exotic species for forest practice, and soil investigations.—*E. N. Munns.*

960. Resvoll-Holmsen, Hanna. **Om betydning af lavdäkkets höide for foryngelsen i furuskog. [Influence of the height of undergrowth on Scotch pine reproduction.]** Tidsskr. Skogbruk 27: 68–70. Mar.–Apr., 1919.—In summarizing her observations the author used local names for the plants; these species evidently differ from those appearing in most other regions.—*J. A. Larsen.*

961. Ritzema Bos, J. **De gevolgen van een fout bij het snoeien van laanboomen. [The results of an error in pruning shade trees.]** Tijdschr. Plantenz. 24 (Bijblad): 49–51. 1918.

962. Stewart, William. **History of the plantations on Shambellie Hill, near Dumfries.** Trans. Roy. Scottish Arboric. Soc. **33**: 40–43. 1919.—This is a letter from a forester addressed to the owner of an estate, in which the forester goes into some detail concerning the planting of both hardwoods and conifers on the estate, the yields and the returns from the plantations.—*C. R. Tillotson.*

963. Taylor, W. L. **Succession in estate forestry.** Quart. Jour. Forest. **13**: 40–45. 1919.—This article touches briefly upon the natural changes in forest successions which have taken place in the past and are perhaps going on now, in their relation to the advisability of foresters bringing about a change in the species of trees grown on a particular site when the old crop is removed. Whether to replant with the same species or not depends on the health and vigor of the cleared crop at its maturity, and the probability of the same species proving financially the most promising for another rotation.—*C. R. Tillotson.*

964. Toumey, J. W. [Rev. of: (1) Trelease, Wm. **The ancient oaks of America.** Mem. Brooklyn Bot. Gard. **1**: 492–501. 1918. (2) Idem. **Naming American hybrid oaks.** Proc. Amer. Phil. Soc. **56**: 44–52. 1917.] Jour. Forestry **17**: 185–186. 1919.

965. Walkington, Alma. **Plowing land before planting.** Quart. Jour. Forest. **13**: 133–136. 1919.—Plowing wet, heavy land, while expensive, and later planting it to forest trees, is preferable to pitting it in the fall and planting in the pits the following spring. Such pits remain wet and unsuitable for the growing of trees. Plowed furrows, on the other hand, have a natural drainage down the field. In planting the plowed land, a dibble can be used, this method being faster than digging a hole for each tree. The trees should not be set more deeply than they stood in the nursery.—*C. R. Tillotson.*

966. Whellens, W. H. **Band saws v. circular saws.** Trans. Roy. Scottish Arboric. Soc. **33**: 86–87. 1919.—A short article dealing with the advantages of the band saw over the circular saw, particularly with large timbers.—*C. R. Tillotson.*

967. WHELLENS, W. H. **Coppice standards.** Trans. Roy. Scottish Arboric Soc. **33**: 87–88. 1919.—A short article in refutation of a statement to the effect that "standards in coppice were left for the express purpose of growing crooked timber for ship-building."—*C. R. Tillotson.*

968. WHITFORD, H. N., AND R. D. CRAIG. **Forests of British Columbia.** Rept. Comm. Conserv. Canada, Committee on Forests. *409 p. 28 pl., 21 maps.* 1918.—This reports the results of three years work by the authors in securing personal knowledge of local conditions in each district and in compiling a large amount of data, including detailed estimates and reports on stands furnished by the British Columbia Forest Branch, timber owners, cruisers, surveyors and others. The forest land area of the province is placed at 149,344 square miles, as compared with 117,000 square miles in the Pacific Coast States of the United States, but the stand of merchantable timber in the former is estimated at only 366 billion board feet as compared with 1300 billion in the latter. The timber on two-thirds of the forest land area of the province has been totally destroyed by fire, and over half of the remainder has been seriously damaged, 200,000 square miles of the province is non-forest land, incapable of producing forests of commercial value. Over half the area of the province is unsuitable either for forestry or agriculture. About 145,000 square miles of this lie above altitudinal merchantable timber line and 55,000 below timber line with soil either too rocky or wet, or the forest so completely destroyed by fire that there is no hope for the natural re-establishment of forest conditions for centuries to come.—The Coast forests of the province comprise only 23,447 square miles of the forest land area, 11,362 square miles of which is merchantable timber with an average stand of about 30,000 board feet per acre; while the Interior forests comprise 125,897 square miles, 40,649 of which is merchantable forest with an average stand of about 5000 board feet per acre. The total stand of timber is estimated at about 230 billion feet in the Coast and 137 billion in the Interior region. The forest land area comprises 36.5 per cent of the Coast region, 43.4 per cent of the Interior region and 42.2 per cent of the entire province. —The timber of the province is practically all soft-woods, containing the following estimated amounts and per cents:

SPECIES	COAST		INTERIOR		TOTAL	
	Million board feet	Per cent	Million board feet	Per cent	Million board feet	Per cent
Western red cedar	59,949	28.0	18,019	13.2	77,968	22.2
Douglas fir	63,400	29.6	12,019	9.2	75,973	21.7
Spruce (all species)	14,165	6.7	58,899	43.1	73,064	20.8
Western hemlock	51,948	24.2	12,164	8.9	64,112	18.3
White fir (balsam)	19,115	8.9	13,838	10.2	32,953	9.4
Lodgepole pine	68		11,793	8.6	11,861	3.4
Western yellow pine			4,208	3.1	4,208	1.2
Yellow cypress	4,056	1.9			4,056	1.1
Western larch			3,152	2.3	3,152	0.9
Western white pine	1,083	0.5	1,617	1.2	2,700	0.8
Cottonwood	516	0.2	272	0.2	788	0.2
Total saw material	214,300		136,535		350,835	
Piling, poles, pulpwood, etc	15,465				15,465	
Total forest resources	229,765		136,535		366,300	

The report analyzes in detail the timber and forest conditions, physical features and land classification, separately by regions, districts, and drainage basins. There are separate silvicultural descriptions of all the important species including character of occurrence, stand per acre, silvical characteristics and utilization, together with notes on insects attack-

ing British Columbia trees.—There are three interesting chapters dealing in broad aspects with the effect of geographical, physiological and climatic and soil relations on occurrence of forests and forest types, their economic importance and utilization, and on forest fires.—The chapter on land tenure describes the salient features of the various forms of tenure, and their relationship to forest administration, including timber leases and timber sales. Chapters on forest administration on Provincial and Dominion Land describe the workings of forestry regulations and revenue secured on these two general classes of land.—A chapter on forest policy draws attention to a few points not sufficiently covered in preceding chapters, including the subjects of forest revenues, and of the need for scientific forest research and for a college of forestry.—A chapter of forest exploitation describes the development of the lumber industry in British Columbia, methods and costs of logging, amount of timber cut in various years, logging regulations and stumpage values. The largest reported lumber cut is for the year 1911, when 1342 million feet were cut. The State of Washington cut over 4000 million in the same year.—The report forms an encyclopedia of information on forest conditions and forest resources of British Columbia and gives an excellent basis for developing a permanent forest policy for the Province.—*W. D. Sterrett.*

969. WILSON, ERNEST HENRY. **A summary report on the forests, forest trees, and afforestation in Chosen (Korea).** Trans. Roy. Scottish Arboric. Soc. 33: 44–51. 1919.—The forests of Chosen are divisible into three groups: (1) Forests of conifers, (2) Forests of hardwood trees, (3) Mixed forests of conifers and hardwood trees. The softwoods include spruce, larch, fir, yew, pine and juniper; the hardwoods walnut, birch, oak, ash, chestnut, popular, basswood, and some others.—Forests of Tohi, Chosen, Hari-momi, Toshirabe, Chosen-matsu, and Chosen Kara-matsu, mixed or more or less pure, cover vast areas on the mountains in the extreme north of Chosen. The Chosen Kara-matsu is found only on volcanic soils in north-eastern Chosen, and especially on the Chang-paisan range of mountains, where it covers large areas and forms extensive forests, often quite pure. The Aka-matsu (*Pinus densiflora*) is found from the extreme south to the extreme north of Chosen, mixed with hardwood trees or forming pure woods. The other softwood trees are widely scattered through Chosen. The remains of forests of hardwood trees occur here and there throughout the length and breadth of Chosen, but extensive forests of these trees grow chiefly on the mountains of the Unsan district, and on the coastal ranges of south and north Kankyo.—If properly conserved these forests are capable of supplying in perpetuity vast quantities of useful timber, and of being a perpetual source of national revenue.—Natural renewal of some of the forests may be effected if the seed trees are left in lumbering operations. This is the most simple and economical method in the hardwood forests and in some of the coniferous forests. It is claimed that regeneration of the forests of Chosen Kara-matsu (*Larix dahurica*, var. *Principis-Rupprechtii*) may be readily effected if the under growth be burned over some years before the forests are cut down. The planting of *Pinus densiflora* promises to be the most successful work in reafforestation yet attempted in Chosen. This tree will grow on the most barren of soils. To reforest the vast areas of mountain land in Chosen, now covered with coarse grass and low shrubs, it is suggested that these be severely burned over and afterwards thickly sown with the seed of several species of birch and with larch, all mixed together.—*C. R. Tillotson.*

970. WOODWARD, KARL W. [Rev. of: HUFFEL, G. **Les ressources rêalisables des forêts Allemandes. [The available resources of German forests.]** *15 p.* Paris, 1918.] Jour. Forestry 17: 430–431. 1919.

GENETICS

GEORGE H. SHULL, *Editor*

971. ANONYMOUS. [Rev. of: WILLIAM BRIERLEY. **An albino mutant of Botrytis cinerea.** Given before the Linnaean Society.] Jour. Bot. 57: 135–136. 1919.

972. ANONYMOUS. **Develops new hybrid cowpeas.** Jour. Heredity 10: 175. April, 1919. —A brief report of the progress of the work with cowpeas of the United States Department of Agriculture, quoted from the Weekly News Letter.—*M. J. Dorsey.*

973. Anonymous. (J. F.) **Variability in plants.** Gard. Chron. 65: 285–286. June 7, 1919.—Occurrence of three cotyledons amongst dicotyledonous plants is quite frequent, especially in *Fuchsia macrostemina* where opposite leaves and three in a whorl may be found on the same plant. *Acer pseudoplatanus* quite frequently produces two, three and four cotyledons. Three cotyledons are followed by three leaves in a whorl.—Tuberous-rooted begonias show important botanical disturbances. The ovary is normally inferior and seed vessel closed, but double garden forms have been observed with ovary superior, valves of seed vessel transformed into petals and bearing the ovules or unfertilized seeds on their upper surface.—*C. E. Myers.*

974. Anonymous. (J. F.) **Variability in plants.** Gard. Chron. 65: 321. June 28, 1919. —Has observed tricotyledonous and polycotyledonous seedlings in several species of normally dicotyledonous ornamentals. Holds that flower parts vary so widely in number that the plan of using the least common multiple as a basis of classification is impractical. [See Bot. Absts. 3, Entries 1022,1023.]—*John Bushnell.*

975. Anonymous. (W. T.) **Variability in plants.** Gard. Chron. 65: 286. June 7, 1919. —States that seedlings with three cotyledons and leaves in whorls of three are not uncommon in *Fuchsia;* smaller branches of such plants may have leaves opposite. [See Bot. Absts. 3, Entries 973,1021.]—*John Bushnell.*

976. Arny, A. C., and H. K. Hayes. **Experiments in field technique in plat tests.** Jour. Agric. Res. 15: 251–262. 1918.—This is a study of the border effect in experimental field plots planted to various cereal crops, including wheat, oats, and barley, in 6-inch drill rows, with alleys between plots. Yields are compared, removing one border row and two border rows. —Border rows contribute a very marked increased yield per acre to the plots, the effect showing in a margin of at least one foot wide. Different varieties appear to respond differently to this border effect. The report is based upon the results of only a single season.—*L. H. Smith.*

977. Bartlett, J. Gardner. **The increase, diffusion, and decline of the Mayflower and other New England stock.** Jour. Heredity 10: 141–142. *Fig. 20.* Mar., 1919.—An article dealing statistically with the increase and diffusion of the Mayflower stock with reference to an article by S. J. Holmes and C. M. Doud, Jour. Heredity, November, 1918 [See Bot. Absts. 2, Entry 414]. The author finds that the present conditions are not so desperate as pictured by the authors of the previous article, since statistics are given to show that there is a gradual increase in the *Mayflower* descendants.—*M. J. Dorsey.*

978. Baur, Erwin. **Ueber eine eigentümliche mit absoluter Koppelung zusammenhängende Dominanzstörung.** [On a peculiar disturbance in dominance associated with absolute coupling.] Ber. Deutsch. Bot. Ges. 36: 107–111. 1918.—If a certain external character depends upon two dominant factors, X and Y, the hybrid between the two races, of which the one contains X and the other Y usually will show this character. The writer finds in crosses with *Antirrhinum,* however, that, if the two factors in question show absolute coupling, the hybrid does not show the character, but presents the character caused by X alone on one part of the plant and that caused by Y alone in another part of the plant; thus a cross between striped and purple, expected to yield a red-flowered F_1, gave striping on a purple ground.—*T. J. Stomps.*

979. Blakeslee, A. F. **A unifoliolate mutation in the Adzuki bean.** Jour. Heredity 10: 153–155. *Fig. 2.* April, 1919.—In a population of over 450,000 plants of *Phaseolus angularis,* which is normally trifoliolate, a single unifoliolate plant appeared. It produced flower buds abundantly, but no flowers developed, the buds dropping at a stage before the petals were visible. The mutant was larger than others of its pedigree, was completely sterile, although buds were formed, and because it did not produce fruit, its vegetative functions were not checked and it held its leaves longer. Such a type has been observed once before in three individuals of *Phaseolus vulgaris.* This undivided leaf type is interesting since the plants of this genus so predominately bear compound leaves.—*M. J. Dorsey.*

980. Blakeslee, Albert F., and B. T. Avery, Jr. Mutations in the Jimson weed. Jour. Heredity 10: 111–120. *Fig. 5–15.* Mar., 1919.—An article in which the authors name and describe several mutative variants of sudden, though rare occurrence which transmit their characters—chiefly through the female sex—to only a part of their offspring. One, particularly, designated N. S., proved nearly sterile with normal plants though it is self-fertile and breeds true.—*M. J. Dorsey.*

981. Bridges, Calvin B. Vermilion-deficiency. Jour. Gen. Physiol. 1: 645–656. July 20, 1919.—A lethal sex ratio in *Drosophila melanogaster* was found to be due not to a simple mutation but to a deficiency (regional mutation or loss or "inactivation") of a portion of sex chromosome. Deficient region includes vermilion locus and flies carrying both vermilion and vermilion-deficiency look vermilion. It extends to the right of vermilion for a distance not exceeding three units. It includes also one or more loci to the left of vermilion because its lethal effect is not balanced by "vermilion sable duplication" which is an extra piece of chromosome carrying vermilion and several factors to its right. It is probable that there is no crossing over at all within the deficient region, that crossing over in adjacent regions is cut down markedly and in more distant regions is either unaffected or slightly increased. All these effects indicate a disturbed synaptic relation. Cytological preparations of deficiency proved unsatisfactory. The stock was lost because of injurious action of deficiency on viability, fertility, and productivity.—*Alexander Weinstein.*

982. Calkins, Gary N. Restoration of vitality through conjugation. Proc. Nation. Acad. Sci. [U. S. Amer.] 5: 95–102. *Tables 1–3.* 1919.—Neither the theory that conjugation restores vital activity to an optimum nor that it results in variations has been conclusively established. Calkins finds "that conjugation, in the ciliated protozoon *Uroleptus mobilis*, actually restores vitality to full metabolic vigor." Endomixis or asexual reorganization with restoration of vitality, occurs in *Uroleptus mobilis* while encysted, and was not allowed to take place in the five lines used in this work. These five lines were derived from the descendants of a single exconjugant at its third division. After 313 generations, during which vitality progressively decreased, the series died out. Specimens, not among those isolated daily, were allowed to conjugate and four filial series of these exconjugants were begun at the 78th, 147th, 237th, and 311th generations. The first of these died in the 348th generation; the second died in the 271st generation; and the third and fourth series were still dividing actively in the 277th and 236th. Four other series were started from these filial series. It was found that conjugation did not begin to take place until from 50 to 70 days from the start of the series. This is the period of sexual immaturity. Division rate indicates the degree of vitality and since the maximum division rate is restored by conjugation in specimens taken from the series at various stages in the decline of vitality the conclusion is reached "that conjugation results in the complete restoration of vitality regardless of the age or the weakened condition of the parent protoplasm, . . ."—*R. W. Hegner.*

983. Collins, G. N. A fossil ear of maize. Jour. Heredity 10: 170–172. *Fig. 7.* April, 1919.—Comment on a description by F. H. Knowlton of fossil ear of maize from Peru. While the fossil form is not identical with any of the existing types, it presents no new characters and therefore appears to be simply a different combination of characters.—*M. J. Dorsey.*

984. Conklin, Edwin G. Heredity and democracy. A reply to Mr. Alleyne Ireland. Jour. Heredity 10: 161–164. 1919.—A reply to Ireland (Jour. Heredity 9: 339–342. 1918. [See also Bot. Absts. 3, Entry 261]) in which it is urged that there is no reason for the conclusion that heredity and democracy are incompatible. [See Bot. Absts. 3, Entries 1000, 1002.] —*M. J. Dorsey.*

985. Coulter, J. M. Evolution of maize. [Rev. of: Weatherwax, Paul. The evolution of maize. Bull. Torrey Bot. Club 45: 309–342. *Fig. 36.* 1918.] Bot. Gaz. 67: 104. Jan., 1919.—See Bot. Absts. 1, Entry 503.

986. Coulter, Merle C. **Chlorophyll inheritance.** [Rev. of: Ikeno, S. **Studies on the hybrids of Capsicum Annuum. II. On some variegated races.** Jour. Genetics **6**: 201–229. *Pl. 8, fig. 1–2.* 1917.] Bot. Gaz. **67**: 95–96. Jan., 1919.

987. Coulter, Merle C **Analysis of quantitative variation.** [Rev. of: Brotherton, Wilber, and H. H. Bartlett. **Cell measurement as an aid in the analysis of quantitative variation.** Amer. Jour. Bot. **5**: 192–206. 1918. (See Bot. Absts. 1, Entry 865.)] Bot. Gaz. **67**: 100. Jan., 1919.

988. Coulter, Merle C. **Hybrid vigor.** [Rev. of: Jones, D. F. **The effects of breeding and cross-breeding upon development.** Connecticut Agric. Exp. Sta. Bull. **207.** *100 p., 12 pl.* New Haven, 1918.] Bot. Gaz. **68**: 150–151. Aug., 1919.

989. Coulter, Merle C. **A corn pollinator.** Bot. Gaz. **68**: 63–64. *1 fig.* July, 1919.—For artificial pollination of corn an ordinary thistle tube is stoppered in such manner as to permit operator to blow through the apparatus. Pollen is placed in bulb and end of stem, bent at right angles, is inserted in a small aperture cut in end of protecting bag placed over silks. By blowing into apparatus, the pollen is thoroughly scattered through the mass of silks. End of the bag is then folded over, thus sealing aperture, the fold being made secure by a paper clip. Main advantage lies in possibility of applying pollen without necessity of exposing silks.—*L. H. Smith.*

990. Danforth, C. H. **Evidence that germ cells are subject to selection on the basis of their genetic potentialities.** Jour. Exp. Zoöl. **28**: 385—412. July 5, 1919.—Breeding experiments with poultry demonstrate selective effect of inhalation of alcohol upon different types of germ cells. The alcoholized heterozygote—brachydactylous, polydactylous, white,—was mated to triple recessive,—normal, colored. Control consisted of eggs of same birds before and after period of treatment. Brachydactyly appeared in 39 per cent of controls, but in 48.2 per cent during period of treatment. Variations in controls were correlated with similar variations during alcoholization. Polydactyly showed no evidence of being affected unless treatment was very intensive. Dominant white was not affected. Idiosyncracies occur in gametic ratios under normal conditions;—as in brachydactyly, 39 per cent from heterozygote instead of 50 per cent.—*P. W. Whiting.*

991. Davenport, C. B. [Rev. of Conklin, Edwin Grant. **Heredity and environment in the development of man.** *2nd ed., 550 p.* Princeton University Press: Princeton, 1918.] Mental Hygiene **3**: 324. April, 1919.—Points out that in the "matter of determinism and responsibility Conklin is inclined to take a middle ground," but suspects that the author's conclusions of this subject "are influenced by non-biological considerations." Reviewer thinks freedom is even more limited than Conklin cautiously concedes. Inhibitions can be cultivated if their germs are present, but not otherwise. "The capacity for inhibitions may be quite as automatic and as instinctive as the instinct itself."—*G. H. Shull.*

992. Davis, Robert L. **Plant breeders' envelope.** Jour. Heredity **10**: 168–169. *Fig. 6.* April, 1919.—An illustrated description of an envelope, made of oiled paper, adapted to covering delicate flowers during hand-pollination.—*M. J. Dorsey.*

993. Edmonds, M. E., and P. Sargeant. **Variability in plants.** Gard. Chron. **65**: 299. June 14, 1919.—Note is made of *Fuchsia* plant which developed a shoot bearing three leaves at each node. Commentor notes that the variation is not particularly uncommon, nor of important biological or horticultural value. [See also Bot. Absts. 3, Entry 1021.]—*C. E. Myers.*

994. Fairchild, David. **Present condition and opportunity of the American Genetic Association.** Jour. Heredity **10**: 65–67. 1919.—An address before the annual meeting of the American Genetic Association in which emphasis is placed upon the necessity of getting to the public mind a correct conception regarding the inheritance of acquired characters. It is pointed out that many important situations in the national life can be corrected in this way.—*M. J. Dorsey.*

995. Fairchild, David. **Some present aspects of immigration.** Jour. Heredity **10:** 68–70. 1919.—A brief abstract of the Fourth Report of the Committee on Immigration of the American Genetic Association. Emphasis is placed upon the advisability of a more rigid rejection of those immigrants found to be mentally defective or diseased. Certain features of the new immigration law are pointed out which show that it is qualitatively selective rather than numerically restrictive.—*M. J. Dorsey.*

996. Freud, Sigmund. **Three contributions to the theory of sex.** *3d rev. ed., 117 p.* Nerv. and Ment. Dis. Publ. Co.: Washington, D. C. 1918.—Book is mostly psychoanalysis of abnormal sexual phenomena in man with special reference to infancy and puberty. Brief references to source of aberrations attribute them chiefly to experiences, in some cases in lesser degree to heredity.—*A. Franklin Shull.*

997. Gager, C. Stuart. [Rev. of: Macfarlane, John Muirhead. **The causes and course of organic evolution. A study in bioenergetics.** *875 p.* The Macmillan Co.: New York, 1918.] Torreya **19:** 93–101. 1919.

998. Goodspeed, T. H., and Pirie Davidson. **Controlled pollination in Nicotiana.** Univ. California Publ. Bot. **5:** 429–434. 1918.—In controlled pollination relative number of pollen grains to number of seeds produced through fertilization determined on six plants of *Nicotiana Langsdorffii* var. *grandiflora.* Few ovule fertilizations are sufficient to cause non-abscission of flowers.—*R. J. Garber.*

999. Gowen, J. W. **Inheritance studies of color and horn characteristics.** Maine Agric. Exp. Sta. Bull. 272: 127–148. *4 fig.* 1918.—Author presents preliminary report of cattle crosses involving Jersey, Guernsey, Ayrshire, Holstein-Friesian, and Aberdeen-Angus. Black is dominant to red and yellow (fawn). Appearance of a deep orange-coated animal from mating of first cross Aberdeen-Angus-Guernsey bull to Guernsey cow indicates that Guernsey breed carries recessive dilution factor. Pigmented muzzle is dominant to unpigmented, pigmented tongue is dominant to non-pigmented, and black switch seems to cause suppression of other switch colors. White markings of inguinal region seem to be dominant, while those of face, neck shoulders, rump, flanks, and legs are probably recessive to coat wholly colored. That the polled condition is a simple dominant is questioned. Author suggests that male sex organs have some action on presence or absence of horns. In cross of beef and dairy types the F_1 showed beef type most in head and shoulder, while dairy type showed most in barrel and hindquarters. Study of milk and fat production indicates, according to the author, independent transmission in which high milk production is dominant to low and low percentage of fat dominant to high. Data are too few for definite conclusions.—*Elmer Roberts.*

1000. Grant, Madison. **Discussion of the article on democracy and heredity.** Jour. Heredity **10:** 164–165. 1919.—[A further discussion of Ireland's article, Jour. Heredity **9:** 339–342. 1918. (See Bot. Absts. 3, Entry 261.)] emphasizing the value of heredity versus environment as a factor in determining social worth in individuals. [See Bot. Absts. 3, Entries 984, 1002.]—*M. J. Dorsey.*

1001. Hall, Prescott F. **Immigration restriction and world eugenics.** Jour. Heredity **10:** 125–127. Mar., 1919.—A discussion of the direct and indirect results of the immigration of foreign peoples of low standard into a country of high standard in relation to world eugenics. Such immigration does nothing but harm to the country receiving it, both biologically and physiologically, and by confinement and limitation in the country from which it comes would prevent the dilution of better stocks. Thus, by encouraging the fit and limiting or preventing the multiplication of the unfit the result is not merely a selfish benefit to the higher races but a good to the world as a whole.—*M. J. Dorsey.*

1002. Hall, Prescott. **Aristocracy and politics.** Jour. Heredity 10: 166–168. 1919.—The last of the articles discussing the position of Ireland [See Bot. Absts. 3, Entry 261] on democracy and the accepted facts of heredity, in which the danger of government by the mediocre majority is pointed out. [See Bot. Absts. 3, Entries 984, 1000.]—*M. J. Dorsey.*

1003. Harland, S. C. **Inheritance of certain characters in the cowpea (Vigna sinensis).** Jour. Genetics 8: 101–132. *1 fig.* Apr., 1919.—This paper reports studies on flower color, seedcoat pattern, and seedcoat color. Dark, pale, and white flower colors occur. Apparently satisfactory interpretations of numerical results are obtained by assuming pale flower color to be due to a factor *L*, effective (in production of pale color) only in Holstein and Small-eye types (see below). Another factor *D*, apparently identical with factor *W* (see below), converts pale into dark flower color. Validity of this interpretation depends on proof that white may be of two types, *llDD* and *lldd*, factor *D* being without effect on flower color except in presence of *L*. Studies on this point not concluded. Three "eye," or seedcoat pattern factors were found, *W*, *H*, and H_1, the two latter having identical effects but being independent in inheritance. Combination of *W* with either *H* or H_1 gives solid color. Absence of all three factors gives Small eye. *W* converts Small eye into Watson and Holstein into solid color. *H* converts Small eye into Holstein and Watson into solid color. The evidence for two Holstein factors is not considered entirely conclusive, but is very strong.—Representing solid color by *S*, Watson by *W*, Holstein by *H*, and Small eye by *SE*, the F_2 of crosses between Small eye and solid should give the unusual ratio $45S{:}3W{:}15H{:}1SE$, and results confirm this.—Three factors affecting seedcoat color were found. Factor *B* converts brown seedcoat into black, and is responsible for dark red or purple tips on young pods, and for red in calyx and peduncles. Factor *M*, in absence of *N* gives maroon seedcoat, while *N*, in absence of *M*, gives light brown coat. *M* and *N* together give dark brown coat.—Types with white seeds and having flowers distinctly tinged with violet were found, as were also solid-colored types with white flowers.—*W. J. Spillman.*

1004. Hartmann, Max. **Theoretische Bedeutung und Terminologie der Vererbungserscheinungen bei haploiden Organismen. (Chlamydomonas, Phycomyces, Honigbiene). [Theoretical significance and terminology of the phenomena of inheritance in haploid organisms. (Chlamydomonas, Phycomyces, honey bee.)]** Zeitschr. indukt. Abstamm. Vererb. 20: 1–26. *6 fig.* Sept., 1918.—Author tried in vain for three years to raise parthenogenetic progeny of *Bombyx mori*. He refers in detail to the work of (1) Pascher on the haploid progeny of a cross of two species of *Chlamydomonas* which differed in more than five characters; (2) Burgeff, who grew a haploid generation from a cross of two varieties of *Phycomyces*, showing segregation for sex as well as for the varietal difference; (3) Newell, who found haploid segregagation among the drones of *Apis mellifica*. He prefers the substantive terms haplont and diplont for the two stages.—*John Belling.*

1005. Hertwig, Günther. **Kreuzungsversuche an Amphibien. [Hybridization studies on amphibians.]** Arch. Mikrosk. Anat. 91: 203–271. *2 fig.* Aug. 20, 1918.—The paper describes, in detail, experiments on hybridizing amphibians (species of *Rana*, *Bufo*, *Triton*, *Hyla* and *Pelobates*). In some cases, no results were obtained because of inability of sperm to enter egg. In others, polyspermy caused irregular cleavage and early death. The more successful cases are classified in several groups. Some crosses produced true hybrids (orthonothi) in which there was biparental inheritance. In others, the sperm nucleus took no part (pseudonothi). The true hybrids might develop fairly normally (tokonothi if fertile, steironothi if sterile), or they might become malformed and die early (dysnothi). In the present work, none of the hybrids were kept long enough to test fertility. With parthenogenetic development, the nuclei might be either haploid or diploid. In the former case, the volume of the nucleus was only half normal and the tadpoles were dwarfish. In the latter case, they developed like the maternal species as far as observed. Reciprocal crosses might

give very different results, even where both crosses could be made at all.—Previous treatment of the sperm with mesothorium radiation or with methylene blue in two cases changed the product of fertilization from the dysnothi to the pseudonothi. The author points out that the result of a cross depends not merely on the harmony between the two nuclei but also on the harmony between sperm nucleus and egg cytoplasm. The degree of relationship between species can not safely be determined by the results of hybridization.—*Sewall Wright.*

1006. Johnson, Roswell H. **The determination of disputed parentage as a factor in reducing infant mortality.** Jour. Heredity 10: 121–124. Mar., 1919.—The necessity of determining the parentage of a child under two years of age is pointed out, as it is below this age that greatest mortality occurs due to lack of support and court decision does not admit of physical resemblance because of immaturity. Methods which will lead to accurate results would reduce the number of illegitimate children and lead to better care of the child and hence reduce its mortality risk. Four such methods are discussed: (1) Alternative inheritance of many abnormalities, (2) More uniform application of the alternative inheritance of certain human traits, (3) Papillary ridges of the palm and sole, (4) Anthropometry. The latter can always be applied and errors eliminated by correction factors. The method is feasible and requires only a sufficient appropriation and an organization to carry on the work.—*M. J. Dorsey.*

1007. Kajanus, Birger. **Ueber eine Kreuzung zwischen zwei Typen von Sommerweizen. [On the crossing of two types of spring-wheat.]** Bot. Notiser 1918: 245–247. Nov., 1918.—The varieties used were "Marzuolo americano" and what had been received from Svalöf, Sweden, under the name "Perl" spring-wheat. The crossing made was Perl ♀ × Marzuolo ♂. The Perl is unawned and has pale leaf-auricles, the Marzuolo is awned and has strongly red auricles. In the F_2 generation, the unawned condition of the Perl appeared to the awned in the ratio of about 3: 1, and the strongly red color of the auricles of Marzuolo to the paler color as 3: 1. In the F_3 generation all possible homozygous and heterozygous combinations of the two characters appeared, the ratio in the segregating families remaining about the same. —*P. A. Rydberg.*

1008. Key, Wilhelmine E. **Better American families. II.** Jour. Heredity 10: 80–83. Feb., 1919.—An analysis of the setting of a defective family in society, showing that only a few individuals in a defective line of descent were able to respond to the customs and institutions of their day, but that others, better endowed from the standpoint of inheritance, were able through marriage into better stock and in some instances a change in the environment, to rise above the level of the others in the social fabric. See next following Entry, 1009.—*M. J. Dorsey.*

1009. Key, Wilhelmine E. **Better American families. III.** Jour. Heredity 10: 107–110. Mar., 1919.—Showing that such traits or trait complexes as ability to calculate, aggressiveness, and perseverance have certain heritable elements which behave in accord with the principle of segregation. Percentages from data given support the following conclusions: (1) When both parents show low grade of ability, all the children are similarly of low grade, (2) When both parents show high grade, practically all the children are similarly endowed, (3) When one parent shows a low grade and the other a medium or high grade the increase in the percentage of medium and high is proportionate to the grade of the abler parent. Two instances from history are given in which an effective building up of trait combinations has occurred and the possibility is pointed out of more accurate ratings in studies of constructive eugenics through the tests of efficiency in the National Army. See next preceding Entry, 1008.—*M. J. Dorsey.*

1010. Lankester, Sir Ray. **The terminology of parthenogenesis.** Quart. Jour. Microsc. Sci. 63: 531–536. Apr., 1919.—"Parthenogenetic" applies only to virgin mother herself (not to offspring), and is limited in cases of either (1) normal egg capable of sexual zygosis, or (2) demonstrably a comparatively recent modification of such. These eggs, incorrectly

called parthenogenetic, are "autoblastic" or "lipospermic." Progeny are "impaternate" or "fatherless." "Virgo intacto" is any adult female not covered (most frogs are always such). Eggs fertilized after discharge are "planktogamic," fertilized within female "hysterogamic," on surface of female "propylogamic." Female (already noted) bearing hysterogamic eggs is a "conjunx," planktogamic or propylogamic a "virgin." Examples are given of use of these terms.—*Merle C. Coulter.*

1011. Lippincott, W. A. **The breed in poultry and pure breeding.** Jour. Heredity **10**: 71–79. *Fig. 10–16.* Feb., 1919.—A brief statement is given of the significance of breed as used by poultry breeders, and the divisions into classes, breeds and varieties accepted in chickens, turkeys, ducks and geese. Emphasis is placed upon the fact that "appearance and not pedigree" is the criterion in poultry breeding. The appearance of an individual or of a breed is not regarded as an accurate index of its hereditary make-up. An instance is given in the case of one family of White Wyandottes, the members of which had repeatedly won prizes in the larger shows in which one breed possessed factors normal to other breeds. Single comb segregates have appeared in this family, and it was found by crossing several females with males carrying the black pigment, that this family also carried the factor which, acting on black pigment, renders it bluish gray as in the Blue Andalusian. These crosses also showed that this family possessed the sex-linked factor for barring as found in Barred Plymouth Rock and White Leghorn. The author suggests the probability that these characters have gotten into the germ plasm of this breed by crossing rather than being the appearance of ancestral characters, and postulates the possibility of a cross with a White Plymouth Rock.—*M. J. Dorsey.*

1012. Love, H. H., and W. T. Craig. **The synthetic production of wild wheat forms.** Jour. Heredity **10**: 51–64. *1 pl., 9 fig.* Feb., 1919.—This article discusses the appearance of a type of wheat in certain crosses between a durum with a common wheat which "is similar in all respects to the typical wild wheat of Palestine," *Triticum dicoccum dicoccoides,* discussed previously by Körnicke, Aaronsohn and Cook. The synthetic type appeared in the F_2 of a cross between Early Red Chief (*T. vulgare*) and Marouani (*T. durum*). The former variety is beardless, with smooth brown chaff and a red kernel and the latter, a typical durum form, has a smooth white or yellowish-white chaff and a yellow or yellowish-white kernel. Photographs are included showing the parents, the F_1, and some of the F_2 and F_3 types. The types similar to the wild arose from two F_2 plants, No. 112 and 113, which possessed the brittle rachises, long basal hairs or bristles, long kernels which resembled the wild types and flat heads. The spikelets, however, were somewhat broader than the wild types. Seventy F_3 plants were grown of the No. 112 which segregated for various characters. In color of chaff, 52 were brown and 18 were white. Eighteen were awnless, 38 were intermediate and 14 were awned. All kernels were red, many were long like the wild types, and most plants produced heads with fragile rachises. Only 10 F_3 plants were obtained from No. 113, which in general behaved like No. 112. Some of the F_3 plants were tested further in the F_4; these were characterized by brittle rachises, red kernels and long basal bristles. Some of the pedigrees gave rise to plants in all respects similar to the wild. Seed from selected plants of the F_4 were again sown with the result that the F_5 was very similar to the F_4. Some of the families in the F_5, particularly two, were like the wild type in all of their characters. The offspring of 2030a1–112–7 were all classed as wild types which led the authors to state that, "there is no question of doubt but that types in every way similar to the wild wheat have been produced synthetically." Among the segregates of 112, it is of interest to note that reversed awns, which have never been observed in any other cross, were found in some types. In these cases the awn was borne on the empty glume and the beak on the flowering glume. Considerable data are also given of the inheritance of characters in the F_1 and F_2 of the cross from which plants 112 and 113 arose.—The evidence presented in this paper is of considerable interest from the standpoint of the prototype of the common wheats. The forms resembling the wild types so closely, appeared as segregates in crosses rather than by mutation, but this is not regarded as positive evidence that the wild wheats of Palestine are proto-

types of the common wheats, because these types might be expected to appear more commonly. The evidence suggests, rather, that the wild Palestine type might have arisen originally through a natural cross and therefore may be regarded as a contemporary form.—*M. J. Dorsey.*

1013. MacCaughey, Vaughan. **Race mixture in Hawaii.** Jour. Heredity 10: 90–95. Feb., 1919.—The second article dealing statistically with the diversity of race intermarriages in Hawaii. [For first article, see Bot. Absts., 3, Entry 269.] This paper presents data to show marriage combinations of Portuguese, Spanish, the native Hawaiians, Americans, British and Germans. In general, it was found that each nationality married largely within itself, but that in each there was great diversity in matings, although the numbers of matings with other nationalities were smaller.—*M. J. Dorsey.*

1014. Magnusson, H. **Geschlechtslose Zwillinge. Eine gewöhnliche Form von Hermaphroditismus beim Rinde. [Sexless twins. A usual form of hermaphroditism in cattle.]** Arch. Anat. u. Physiol. 1918: 29–62. *3 pl., 8 fig.* 1918.—The principal interest of this contribution to the study of the intersexual condition of the female of two-sexed twins of cattle is the description of 11 cases of the author. The cases are not described very exhaustively but they contain valuable data on the anatomy of the free-martin, especially of some very extreme cases of transformation involving the external genitalia to an unusual extent. The material at the disposal of the author comprised 64 cases of "sexless heifers" found in the market. In 37 of these cases a clear history could be obtained; all were twin to a bull. He also had at his disposal one case of foetal two-sexed twins with a common chorion in which large branches of the umbilical vessels of the two foetuses were in direct communication; the ovaries of the mother showed two corpora lutea, one in each ovary. The author refers to a more complete publication in Swedish on this material; but does not give the reference.—The present paper includes some microscopical observations; the outstanding fact in this connection is the general testis-like character of the gonad;—the albuginea is similar to that of the testis; canals similar to seminiferous tubules frequently occur but lined only with a cubical epithelium in which no spermatogonia or later stages of spermatogenesis occur; there are usually inclusions similar in structure to the rete testis. No germinal epithelium ever occurred and no ovarian follicles. The gonad is similar in all cases to a hypoplastic testis. However, there is great variation in the individual cases.—All of the cases show a more or less pronounced male condition of the internal organs of reproduction; testes, vasa deferentia, seminal vesicles and sometimes prostate; of the female organs the ovary and oviduct never occur, the uterus is always much reduced, in many cases no larger than the uterus masculinus of the bull; the vagina is extremely reduced. On the other hand the external organs of reproduction and the udder are almost always distinctly female in character.—The author holds that the twins are monozygotic in spite of the cited fact that Tandler and Keller always found two corpora lutea for such twins (in 17 cases) and that he himself found the same condition in four cases of foetal twins. These facts are lightly disposed of. The author also holds that both twins are of the male sex in spite of the fact that this interpretation raises the percentage of same-sexed twins to 96 per cent instead of the expected 50 per cent. In his theoretical interpretation he leans towards Hart's theory, that in the hypothetical division of the assumed single male zygote to form twins the genital determinants are unequally divided so that the "potent" male characters go to one twin and the "impotent" to the other. The author, however, points out that this never happens in the case of the female zygote, and moreover that the "potent" twin of the free-martin is a normal male possessing the so-called impotent parts.—*F. R. Lillie.*

1015. Mendiola, Nemesio Blanco. **Variation and selection within clonal lines of Lemna minor.** Genetics 4: 151–182. *6 fig.* Mar., 1919.—This is a study of clonal variation and the effect of selection on such variation in the duckweed, *Lemna minor* The work reported extended over a period of one and one-half years and involved several thousand specimens. The usual method of reproduction in *Lemna* is budding. Within a wild population races were found to exist with fronds of diverse shape; no diversity was observed in the speed of

reproduction; but strains differing in size probably are present. Clones were reared on a nutrient medium modified from Pfeffer. Different shapes of fronds appear within a clone with one shape predominating, but these differences are not inherited, being probably merely somatic variations. A study of three fronds of unusual shapes proved these aberrant shapes also to be nonheritable. Selection for greater and lesser speed of reproduction within a clone was ineffectual. Plants grown in a nutrient solution were more variable in size than those grown in tap water, and fronds previously grown in nutrient solution produced offspring which were very much smaller than themselves; this decrease in size, however was not inherited. Increase in size is also nonheritable. Four clones were used for the study of the effects of selection on size of frond, but no conclusive evidence that selection is effective was obtained.—*R. W. Hegner.*

1016. Morgan, T. H., and Calvin B. Bridges. **The inheritance of a fluctuating character.** Jour. Gen. Physiol. **1**: 639–643. *2 fig.* July 20, 1919.—Selection of *Drosphila melanogaster* for more marked thorax pattern proved ineffective until suddenly a few darker individuals appeared. These were due to a mutation in third chromosome. Cross of mutant race with wild flies indicates that only a single factor difference is involved and that contamination of factors does not occur.—Another (still darker) race arose also by mutation from the original stock.—*Alexander Weinstein.*

1017. Murbeck, Sv. **Über staminale Pseudapetalie und deren Bedeutung für die Frage nach der Herkunft der Blütenkrone. [On staminal pseudapetaly and its significance for the problem of the origin of the corolla.]** Lunds Universitets Arsskr., N. F. (Avd. 2.) **14**: 1–59. *9 fig.* Nov. 25, 1918.—Staminal pseudapetaly refers to apetaly where stamens occupy loci of petals. Author presents detailed studies of this condition in *Coleogyne, Cercocarpus* and *Neviusia,* where in case of certain stamens position and innervation prove them to be transformed petals; with apetaly is associated non-entomophilous condition. Author briefly refers to over fifty other cases of pseudapetaly, the reference being in part based on Penzig's "Pflanzenteratologie." In some instances, as *Capsella, Verbascum* and *Solanum,* the pseudapetalous condition seems to have arisen suddenly and independently of environmental influences; in *Capsella* and *Verbascum* it is known to reappear in a portion of the descendants; several other cases, the method of whose origin is uncertain, show pseudapetaly to be "fixed." —*J. P. Kelly.*

1018. Nordstedt, C. T. O. [Swedish rev. of: Heribert-Nilsson, N. **Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung Salix. [Experimental studies on variability, segregation, speciation and evolution in the genus Salix.]** Lunds Universitets Årskr. N. F. (Avd. 2.) **14**[23]: 1–145. *65 fig.* 1918.] Bot. Notiser **1919**: 39–40. 1919.

1019. Nordstedt, C. T. O. [Swedish rev. of: Almquist, E. **Linne's Vererbungsforschungen. (Linnaeus's investigations in inheritance.)** Bot. Jahrb. **55**: 1–18. 1917.] Bot. Notiser **1918**: 62–63. 1918.

1020. Nordstedt, C. T. O. [Swedish rev. of: Johannsen, W. **Årftligheten i historisk och experimentell belysning. [Heredity in historical and experimental light.]** *viii + 327 p., 52 fig.* 1918.] Bot. Notiser **1918**: 214. 1918.

1021. Page, E. Judson. **Variability in plants.** Gard. Chron. **65**: 251. May 24, 1919.—Observed a tricotyledonous *Fuchsia* seedling which continued to produce leaves in whorls of three. [See also Bot. Absts. 3, Entries 973,975,993.]—*John Bushnell.*

1022. Page, E. Judson. **Variability in plants.** Gard. Chron. **66**: 10. July 5, 1919.—Extends the idea of the "least common multiple" to a "theory of intravolution" in attempting to account for variations within a species. Holds that a "composite creative principle" determines the range of variability of a species, and that variations are due to an outcropping of some latent element in this principle. [See Bot. Absts. 3, Entries 974, 1023.]—*John Bushnell.*

1023. PAGE, E. JUDSON. [Misprinted *Sage*.] Variability in plants. Gard. Chron. 65: 308, June 21, 1919.—Suggests that botanical classification should take into account the variability in leaf and flower part number; classifying on a basis of the least common multiple of the range of numbers rather than on the accepted basis of the numbers most frequently occurring. [See Bot. Absts. 3, Entries 974,1022.]—*John Bushnell.*

1024. PASCHER, A. **Ueber die Beziehung der Reduktionsteilung zur Mendelschen Spaltung. [The relation of the reduction division to Mendelian segregation.]** Ber. Deutsch. Bot. Ges. 36: 163–168. 1918.—Apparently a recapitulation of a previous paper describing experiments with *Chlamydomonas*, considered here in the light of Mendelian theory.—*John Belling.*

1025. POMEROY, CARL S. **Bud variations in sugar cane.** Jour. Heredity 10: 129–135. *Fig. 16–17.* Mar., 1919.—An article indicating the importance of bud variations in sugar cane, together with their place of origin, types, and frequent occurrence. The difference between mother plants and sports is often as great as between recognized varieties. Bud variations have been recorded, as: (1) Differently colored side shoots from one cane, (2) differently colored canes in one stool growing from a single piece of planted cane, (3) A stalk with some joints striped and some unstriped, (4) Strains showing differences in hardiness, (5) Strains showing differences in sugar content.—*M. J. Dorsey.*

1026. PUSCH, G. **Inbreeding live stock.** Jour. Heredity 10: 88–89. Feb., 1919.—An abstract of an article by two German workers, Toggenburg and Erzgebirge, in which it was shown that inferior animals were produced by excessive inbreeding in goats and sheep.—*M. J. Dorsey.*

1027. RASMUSON, H. [Rev. of: DAHLGREN, K. V. O. **Über einige Kreuzungsversuche mit Chelidonium majus L., Polemonium coeruleum L. and Lactuca muralis L. (On several crossing experiments with Chelidonium majus L., Polemonium coeruleum L., and Lactuca muralis L.)** Svensk Bot. Tidskr. **12**: 103–110. 1918.] Zeitschr. indukt. Abstamm. Vererb. **20**: 302–303. April, 1919.

1028. REED, H. S. **Growth and variability in Helianthus.** Amer. Jour. Bot. 6: 252–271. *3 fig.* June, 1919.—Measurements on height of 58 plants of *Helianthus annuus* taken at intervals of seven days for a period of eighty-four days during the grand period of growth. Growth rate at first slow, maximum growth at about middle of grand period, after this decrease in rate with the beginning of flower-bud formation. Variability of height, as expressed by standard deviation and coefficient of variability was greatest at end of growing period. Plants were classed into four groups according to height when first measured. Showed tendency throughout to remain in initial groups, i.e., plants small in the beginning tended to remain small, those tall in the beginning tended to remain tall. Concludes that height and variability are not due to chance of environment alone, because there are large and consistent discrepancies between standard deviations of observed percentage values of position of plants in each of the four groups and standard deviation of mean percentages to be expected if heights of plants were distributed according to pure chance. Fourteen tables and three graphs are given. [See next following entry, 1029.]—*Helene Boas Yampolsky.*

1029. REED, HOWARD S., AND R. H. HOLLAND. **The growth rate of an annual plant Helianthus.** Proc. Nation. Acad. Sci. [U. S. Amer.] **5**: 135–144. *Fig. 1–3, tables 1–3.* 1919.—Measurements of height of 58 plants of *Helianthus* at seven-day intervals during the grand period of growth showed that growth rate approximated course of an autocatalytic reaction. Taken as indication that growth rate is governed by constant internal factors rather than by external factors, as temperature or transpiration with neither of which marked correlation was found. [See next preceding entry, 1028.]—*Helene Boas Yampolsky.*

1030. ROBERTS, H. F. **The founders of the art of breeding. II.** Jour. Heredity 10: 147–**152.** *Fig. 1.* April, 1919.—See also Bot. Absts. 3, Entry 65.

1031. Sand, K. **Experimenteller Hermaphroditismus. [Experimental hermaphroditism.]** Pflügers Arch. Physiol. 173: 1–7. 1918.—This is preliminary paper in which writer states briefly results of experiments on transplantation of gonads of rats and guinea-pigs. In the main, he confirms Steinach. By transplantation of testes into spayed female rats he obtained development of both somatic and psychic characters of the male to considerable extent. He succeeded in transplanting simultaneously an ovary and a testis into a castrated male guinea-pig, which became hermaphroditic both somatically and in behavior. Transplantation of ovaries into uncastrated males failed except in cases in which the ovary was inserted in middle of testis. This succeeded in both rats and guinea pigs. Female characteristics developed to some extent at least in latter. In both cases ripe follicles and corpora lutea were formed in contact with testicular tissue, which, in the rat, showed spermatogenesis. A theoretical explanation is attempted.—*Sewall Wright.*

1032. Sargent, P. **Variability in plants.** Gard. Chron. 65: 299. June 14, 1919.—Reports that *Fuchsia Riccartonia* and *F. pumila* not uncommonly have leaves in whorls of three. [See Bot. Absts. 3, Entries 973, 975, 1021.]—*John Bushnell.*

1033. Saunders, A. P. **How to hybridize peonies.** Florists' Exch. 48: 187. Aug. 2, 1919. [Also Bull. Peony News, No. 8, May 19, 1919.]—Very popular account of the technique of hybridization, especially as applied to peonies.—*Orland E. White.*

1034. Schacke, Martha A. **A chromosome difference between the sexes of Sphaerocarpos texanus.** Science 49: 218–219. Feb. 28, 1919.—Eight chromosomes are found in the cells of both the male and the female gametophytes. The chromosome groups are alike as to seven of the eight chromosomes, which are rod-shaped, usually curved. The eighth chromosome in the female is longer and thicker than any of the other seven. The male does not possess this large chromosome, but has instead a very small one, commonly nearly spherical, and much smaller than any in the female.—*C. E. Allen.*

1035. Sheppard, W. J. **Hermaphrodite bees.** Jour. Heredity 10: 160. April, 1919.—One hive of bees was found to throw out malformed bees for two successive seasons, 1917 and 1918. Thirteen distinct types were observed, such as a worker eye on one side, and a drone eye on the other, or perfectly formed drones as far as the petiole with the remainder of the body and the stinger like the worker. Others again were the reverse of this. These forms came from worker cells and were so capped that they could be recognized before they hatched. Five queens hatched from this colony and all perpetuated similar malformations.—*M. J. Dorsey.*

1036. Shull, A. F. **Environment and inherited characters in Hydatina senta.** Biol. Bull. 34: 335–350. 1918.—Females living in water openly exposed to the air lay about 52 per cent of their eggs at the surface film, but those living in water exposed to an atmosphere containing an excess of oxygen, lay only about 25 per cent at the surface film. These latter females produce eggs that are slightly larger than the eggs which the females produce while living in water exposed to ordinary air.—The eggs laid in the water exposed to oxygen, hatch in a slightly shorter time and more uniformly than the other eggs under air conditions. More eggs are laid at the surface film at high temperatures than at low temperatures.—Fertilized eggs kept continuously at low temperatures, 2° to 12°C., above freezing, hatch better than those kept at room temperature. Those which do not hatch readily are not induced to hatch better by freezing. Cross-bred fertilized eggs hatch better than inbred ones when dried overnight and remoistened. Fewer inbred fertilized eggs hatched after being dried for four weeks than those dried for shorter periods.—*D. D. Whitney.*

1037. Southworth, W. **Twinning in alfalfa.** Jour. Heredity 10: 182–183. *Fig. 12–13.* April, 1919.—Twin hybrids appeared in alfalfa crosses which were identical in appearance. The line of descent in which they appeared is as follows: The original cross between alfalfa and Black Medick was made in 1912. In 1913 an F_3 plant of this combination was crossed

with white clover as the pollen parent. From this last cross five F_1 plants were obtained, four of which produced seeds, the fifth being at first totally sterile, but when propagated vegetatively in 1914, about 20 plants were obtained most of them producing a small quantity of seed. Eleven plants were obtained from this seed and in 1917 two were pollinated with White Sweet Clover. Of the seven F_1 plants of this cross one bore 42 seeds, one of which produced the twin seedling illustrated. Two other twin plants were found in the progeny of the original cross but in a different line from the first one.—*M. J. Dorsey.*

1038. Terry, J. R. **A wingless Wyandotte.** Jour. Heredity 10: 175. *Fig. 8.* April, 1919.—A pullet without wings and a cockerel without tail occurred in a flock of normal chicks. The pullet, mated to a normal male, has produced only normal chicks.—*M. J. Dorsey.*

1039. Thompson, J. W. **Breeding milk goats.** Jour. Heredity 10: 156–160. *Fig. 3–5.* April, 1919.—An argument for more general use of the goat as a source of milk, on the basis of quality of milk in nutrient elements and vitamines, greater hardiness, and ease and cheapness of keeping.—*M. J. Dorsey.*

1040. Tischler, G. **Untersuchungen über den Riesenwuchs von Phragmites communis var. pseudodonax. [Investigation of the gigantic growth of Phragmites communis var. pseudodonax.]** Ber. Deutsch. Bot. Ges. 36: 549–558. 1918.—The writer compared the cytology of *Phragmites communis* with that of its variety *pseudodonax*, a giant form. The number of chromosomes was the same in both cases, namely 36 (or 18 in the haploid phase), but in the giant type they were unmistakably larger than in the ordinary form. As in the giant form of *Primula sinensis*, the cells of the variety *pseudodonax* were in general larger than those of the ordinary *Phragmites communis.*—*Clara Fonteyn.*

1041. Tjebbes, K., and H. N. Kooiman, **Erfelijkheidsonderzoekingen bij boonen. [Genetical experiments with beans.]** Genetica 1: 323–346. *1 colored pl.* 1919.—The pink marbled Dwarf Prague bean is red-brown-striped on an ivory-colored ground. When crossed with a yellow bean (♂) of the type Non Plus Ultra, it gives in F_1 beans whose seedcoat is yellow-marbled on an ivory ground, and at the same time red-brown striped. The hybrid behaves in F_2 as a monohybrid, though the seedcoats of the parents differ in more than one character (color, spotting, taste).—A spontaneous hybrid from the yellow bean was blue-black-marbled on an ivory ground. It produced, in respect to the characters concerning the seedcoat, six phaenotypes. The factors, which were present in the hybrid in a heterozygous condition, are the following: Z changes yellow to blue-black; V causes the marbling of the seedcoat. The phaenotypes are these: Yellow, *zzvv*; yellow-marbled, $zzVv$; pink or violet marbled; $zzVV$; blue-black, $ZZvv$ or $Zzvv$; blue-black-marbled, $ZZVv$ or $ZzVv$; Blue-marbled, $ZZVV$ or $ZzVV$.—All the marbled ones have an ivory ground. In order to explain these facts, we accept, (relying upon some previous researches), that we may compare the factor V, in its effects, with a corrosive substance, and that its presence in a homozygous condition destroys the pigment more than when present in a heterozygous condition.—*H. N. Kooiman.*

1042. Van Fleet, W. **New pillar rose.** Jour. Heredity 10: 136–138. *Fig. 18–19.* Mar., 1919.—A description of the parents and W. S. 18, a seedling of the cross (*Rosa odorata* × *R. wichuraiana*) × (*R. soulieana* × *R. setigera*). W. S. 18 combines many of the desirable qualities of all the parents and is especially recommended as a pillar rose. Many attractive seedlings, some of dwarf growth with double, blush and white blooms borne throughout the growing season, have been secured.—*M. J. Dorsey.*

1043. Van Herwerden, M. A. **De terugkeer van een sedert zeven jaar verdwenen kenmerk in een cultuur van Daphnia pulex. [Reappearance of a character which had disappeared for seven years, in a culture of Daphnia pulex.]** Genetica 1: 321–322. 1919.—In a culture of *Daphnia pulex* bred for 9 years in the laboratory a part of the parthenogenetic young, leaving

the maternal brood-pouch, contained on the dorsal side of the shell in the heart region, 1, 2, or 3 little dents, which disappeared after the first ecdysis. The last time these dents had been noted was in the year 1911.—During the years 1911–1918 this character disappeared in the stock (cultures have been examined weekly), but in October 1918 a young *Daphnia* was born with an unmistakable chitin dent, the progeny of this animal being dentless again.—The reappearance of this character after being lost for seven years proves that although this phenotypic character has disappeared, the genotypic constitution of these laboratory-bred animals had undergone no change.—*M. A. van Herwerden.*

1044. Van Herwerden, M. A. **De invloed van radiumstralen op de ontwikkeling der eieren van Daphnia pulex. [Effects of the rays of radium on the oogenesis of Daphnia pulex.]** Genetica **1**: 305–320. July, 1919.—Dutch version of a paper on the same subject published in Versl. Kon. Akad. Wet. Amsterdam 20^4: 1918.—See Bot. Absts. 2, Entry 961.—*G. H. Shull.*

1045. Weatherwax, Paul. **The ancestry of maize—a reply to criticism.** Bull. Torrey Bot. Club **46**: 275–278. July, 1919.—Refutation of hypothesis advanced by J. H. Kempton and G. N. Collins regarding hybrid origin of maize. Author believes development by gradual evolution better explanation.—*R. J. Garber.*

1046. Whiting, P. W. **Two striking color variations in the green frog.** Jour. Heredity **10**: 127–128. Mar., 1919.—The many variations in color of the green frog, *Rana clamitans* Latrielle, are explained by Mary C. Dickerson in *The Frog Book.* Green color is produced as the result of black and yellow pigments and a structure, the so-called interference layer, which is a single layer of polygonal cells between the epidermis and black pigment. These cells contain the yellow pigment, but if they were empty the black pigment would be seen through them,—making the color blue, due to the absorption of the longer light rays. When the interference cells contain yellow, the blue is seen through the yellow and the result is green. Changes in color are due to the expansion or contraction of the black pigment which presses close to the interference layer, thus diminishing the density and giving a brown color and *vice versa.*—Two color variations have been noted; one in which the yellow pigment was entirely lacking and the black reduced to a very light sepia, the skin appearing creamy white. This variation is apparently comparable to that described by Haecker in the tiger salamander. The other variation was a young frog lacking black pigment entirely, the skin being a clear light yellow, the iris clear gold, the pupil pink. These phenomena may be explained, employing Sewall Wright's theory of two enzymes for color inheritance in mammals, by extending it to amphibia.—*M. J. Dorsey.*

1047. Woods, F. A. **Good qualities are correlated.** Jour. Heredity **10**: 84–86. Feb., 1919.—A review of the evidence tending to show that individuals which possess rare and desirable qualities in one line are also capable in other lines. The importance of this conception is emphasized in view of the fact that some writers have held that there is considerable uncertainty of success in attempting selection within a race, if when there is improvement in one direction there is retrogression in another.—*M. J. Dorsey.*

1048. Worsham, E. Lee. **Twentieth annual report of the State Entomologist for 1917.** Georgia State Bd. Entomol. Bull. 51. *44 p., 1 pl., 2 fig., 1 map.* 1919. [See Bot. Absts., Entry 378.] Tests of a number of varieties of cotton, with respect to their yield, length of fiber, resistance to wilt, and earliness of maturity are described. Some of the varieties are named and the results tabulated.—*A. Franklin Shull.*

HORTICULTURE.

J. H. Gourley, *Editor*

1049. Addis, José M. Una verdura saludable: la acedera. [Sorrel, a healthful vegetable.] Revist. Agric. Com. y Trab. 2: 281. *1 fig.* 1919.

1050. Anonymous. Revised compatibility chart of insecticides and fungicides. New Zealand Jour. Agric. 18: 39–40. 1919 .—See Bot. Absts. 3, Entry 1148.

1051. Anonymous. The home orchard. New Zealand Jour. Agric. 18: 40–44. 1919.—Brief recommendations regarding sprays, spray pumps, and time and method of applications. Special instructions are given for codlin-moth, scale insects, woolly aphis, red mite, and fungus blights.—*N. J. Giddings.*

1052. Arcangeli, Giovanni. Altre osservazioni sulle varietá Lycopersicum e costata del "Diospyros Kaki." [Further observations on the varieties Lycopersicum and costata of the "Diospyros Kaki."] Bull. R. Soc. Toscana Orticult. 4: 24–29. 1919.—Notes on two varieties of *Diospyros Kaki* (*Lycopersicum* and *costata*), with especial reference to the falling of the partially developed fruits. [See also following entry, 1053.]—*W. H. Chandler.*

1053. Arcangeli, Giovanni. Altre osservazioni sulle varietá Lycopersicum e costara del "Diospyros Kaki." [Further observations on the varieties Lycopersicum and costata of the Diospyros Kaki.] Bull. R. Soc. Toscana Orticult. 4: 45–49. 1919.—Two persimmons were left in water from November 10 to March 10 and the fungus that appeared was described without specific determination; and two were placed for an equal length of time in strong sodium chloride solution and their behavior noted. There are also further notes on the behavior of the two varieties of *Diospyros Kaki.* [See also preceding entry, 1052.]—*W. H. Chandler.*

1054. Barthe, A. E. Cultivo industrial de la higuereta. II. Explotacion industrial.—Extraccion del aceite. [Castor bean, machinery used and mothods of extracting oil.] Revist. Agric. Com. y Trab. 2: 13–24. *14 fig.* 1919.—The content of oil of different varieties is discussed. The machinery used and the methods of extraction, clarifying and purifying oil in different countries are described with critical comments. The uses of the oil and chemical and physical properties are described as also those of various by-products. In appendix A, the geometrical arrangements possible of the plants in the field are discussed.—*F. M. Blodgett.*

1055. Bean, W. J. Malus rivularis. Curtis Bot. Mag. 15: *Pl. 8798 (colored).* 1919.—See Bot. Absts. 3, Entry 2311.

1056. Bocher, M. H. Les jardins portagers scolaires en 1917. [School vegetable gardens in 1917.] Compt. Rend. Acad. Agric. France 3: 1086–1091. 1917.—A succinct statement of the work accomplished by boys and girls in growing vegetables on waste land and in helping to relieve the shortage of labor. It is estimated that these workers harvested a minimum of 500,000 kilos. potatoes and not less than this quantity of beans, cabbage, carrots, and turnips.—*O. Butler.*

1057. Brann, F. R. Factors concerning the drop of immature citrus fruit in central California. Monthly Bull. Comm. Hort. California 2: 74–75. 1919.—Two distinct "drops" occur during the early development of citrus fruits; the first, known as the "natural slough," which occurs when the fruit is first formed in April, is of greater economic importance, and the "June drop," which occurs when the fruits are about the size of hazelnuts. The stem is dropped with the fruit during the "natural slough" and retained by the tree during the "June drop." The factors which are largely responsible for the "natural slough" are: (1) Excessive transpiration of moisture. (2) Plowing and deep cultivation during the spring.

Avoid plowing between March 1st and June 15th, to prevent injury to root systems when trees are making maximum growth. Plow, instead, during October to February. (3) Improper moisture content of soil by incorrect irrigation methods, especially during April, May or June. (4) Improper drainage and subsoil conditions. (5) Insect pests. Four insects primarily responsible are given. The "June drop" is due to one direct cause—citrus fungus (*Altenaria citri*). To reduce the development of this fungus, adopt clean culture during winter, keep trees pruned properly and permit no decayed oranges to remain in the grove.—*E. L. Overholser.*

1058. Calvino, Mario. **El pimiento sarmentoso del Peru. [The climbing pepper of Peru.]** Revist. Agric. Com. y Trab. 2: 61. *1 fig.* 1919.—The clinging pepper of Peru (*Capsicum pubescens*) is described as one with notable vigor, a heavy producer and probably useful for hybridization with the Chili pepper. A technical description is given.—*F. M. Blodgett.*

1059. Calvino, Mario. **Resena general sobre la aboricultura frutal de Mexico. [Mexican Horticulture.]** Revist. Agric. Com. y Trab. 2: 252–258. *14 fig.* 1919.—The different climatic zones of Mexico are outlined and the more important fruits in each are described with particular reference to history, habit of growth, and character and commercial value of the fruit.—*F. M. Blodgett.*

1060. Calvino, Mario. **Alta horticultura, Las inyecciones interorganicas en las plantas. [Inorganic injections in plants.]** Revist. Agric. Com. y Trab. 2: 287–288. *7 fig.* 1919.—Experiments previously reported in Bull. 75 and 79 of the Estacion Agricola Central de Mexico are reviewed and the starting of similar tests in Cuba is described.—*F. M. Blodgett.*

1061. Cushman, Allerton S. **Growing medicinal plants in America.** Jour. Heredity 10: 32–38. *Fig. 1–3.* 1919.—A reprint from a previous article in which the author deals with the botanical source of many drugs, and the limitations, difficulties, and conditions encountered by a group of workers whose purpose it was to demonstrate that American methods were capable of making us independent of Central Europe with respect to some very necessary medicinals.—*M. J. Dorsey.*

1062. Davis, W. E., Jr. **Some lime-loving alpines.** Garden Mag. 29: 21. 1919.—Alpine plants are divided into three sections: (1) those whose cultures demand that there be lime in the soil in which they grow, known as lime-loving alpines; (2) those which do not make this requirement; and (3) those which protest against any soil of a calcareous nature. It is pointed out that the formation of a considerable portion of the Alps is limestone and that plants coming from these formations should have a similar habitat when planted elsewhere. Then follows a discussion of the application of this to plantings of Alpine plants, with a long list of those classed as lime-loving species.—*H. C. Thompson.*

1063. Esam, Gordon. **Tests with unfruitful plum trees.** New Zealand Jour. Agric. 18: 162. 1919.—Reports are results of experiments in cross-pollination combined with pruning.—*E. R. Hodson.*

1064. Fairchild, David. **Testing new foods.** Jour. Heredity 10: 17–28. *Fig. 1–5.* 1919.—A discussion of the methods and practices necessary in finding and testing new foods together with the difficulties encountered in introducing them on domestic markets.—*M. J. Dorsey.*

1065. Farrington, E. I. **The worlds best for our own gardens.** Garden Mag. 29: 18. Feb., 1919.—Contains information on a number of introduced trees and shrubs found in nurseries.—*H. C. Thompson.*

1066. Hecke, G. H., J. E. Rickards, E. E. Kaufman, and R. G. Risser. California crop distribution and estimates, 1918.—A bulletin dealing with the acreage, distribution, tonnage and evaluation of commercial fruit and vegetable crops in California. Monthly Bull. Comm. Hortic. California 4: 143–225. *Fig. 62–93.* 1919.

1067. Hemmi, Fumiwo. On the carbohydrates of the edible tubers of Japan. Jour. Coll. Agric. Hokkaido Imp. Univ. 8: 33–76. 1919.—See Bot. Absts. 3, Entry 1219.

1068. Hutchinson, J. Primula bellidifolia. Curtis Bot. Mag. 15: *Pl. 8801 (colored).* 1919.—See Bot. Absts. 3, Entry 2263.

1069. Hutchinson, J. Rhododendron oleifolium. Curtis Bot. Mag. 15: *Pl. 8802 (colored).* 1919.—See Bot. Absts. 3, Entry 2264.

1070. Hutchinson, J. Desmodium cinerascens. Curtis Bot. Mag. 15: *Pl. 8805 (colored).* 1919.—See Bot. Absts. 3, Entry 2265.

1071. Jumelle, H. Sur la culture, a Marseille, de diverses varietes de ricin. [Varietal tests at Marseilles with castor bean.] Compt. Rend. Acad. Agric. France 1919: 45–47. 1919. —Twenty-three varieties of castor bean were grown at the botanical gardens in Marseilles of which twelve matured their seeds, including all the sorts from Senegal and two Indian sorts. The Brazilian sorts mostly did not mature.—*E. A. Bessey.*

1072. Lindet. Sur l'utilisation des sarments de vigne, des pépins et des marcs de raisins. [The utilization of grape shoots, seeds, etc.] Compt. Rend. Acad. Agric. France 1919: 156–157. 1919.—Reports investigations of Dr. Ventre on the development of alcohol to the extent of 1.25 to 2.05 per cent in grape shoots placed in the silo, by intracellular fermentation, not by action of yeasts. On distillation 6 per cent of the product is amyl alcohol. The shoots also contain 1.4 to 1.5 per cent of tartaric acid.—*E. A. Bessey.*

1073. Lindet. Sur la fabrication de l'huile de palme neutre. [Method of producing neutral palm oil.] Compt. Rend. Acad. Agric. France 1919: 158–159. 1919.—Common palm oil is rancid and very acid due to permitting the fruits to become over-ripe. By picking them just before maturity and boiling immediately in water the oil obtained contains only 0.2 per cent acid and can be used for food purposes.—*E. A. Bessey.*

1074. McClelland, T. B. Vanilla: a promising new crop for Porto Rico. Porto Rico Agric. Exp. Sta. Bull. 26. *32 p. Pl. 1–3, fig. 1–4.* 1919.—Vanilla (*Vanilla planifolia*) has never been grown commercially in Porto Rico although conditions are admirably adapted for its production. Experimental plantings have yielded at the rate of $400 per acre in the fourth year, and $700 to $900 in the fifth ($2 to $4 per pound). In starting a vanillery it is necessary to plant trees to support the vines for which the leguminous dwarf bucare (*Erythrina corallodendron*) is well adapted. A leaf mulch is very desirable. Long cuttings are preferable to short ones. Hand pollination of vanilla is necessary, but the number of blossoms pollinated has a direct effect on the size of the beans; pollination of a large number of blossoms means the production of short inferior beans. Vanilla culture, because of the small bulk and imperishability of the finished product, is recommended for districts remote from good roads.—*John A. Stevenson.*

1075. McHatton, T. H., J. W. Firor and R. E. Blackburn. Growing tomatoes in Georgia. Georgia State Coll. Agric. Bull. (Reprint) 145. *12 p., fig. 1.* May, 1919.—Considers varieties, culture, soil, preparation, spraying, harvesting and fertilization. In discussing fertilizer problems, it is concluded that phosphorus is by far the most important single element in tomato (*Lycopersicum esculentum*) fertilization in south Georgia. Phosphorus in connection with stable manure proved to be the most economical fertilizer. Some of the fertilizer tests led to the conclusion that too much nitrogen might be injurious to tomatoes.—*T. H. McHatton.*

1076. Meller, C. L. **A plant for sun and sand.** Garden Mag. 29: 15. Feb., 1919.—Wild Bergamot (*Monarda fistulosa*) claimed to be valuable plant for sandy, sunny locations. —*H. C. Thompson.*

1077. Meller, C. L. **Contriving for flowers in the shade.** Garden Mag. 29: 17. Feb., 1919.—Mentions ornamental plants that thrive in dense shade and others that do well in partial shade.—*H. C. Thompson.*

1078. Paddock, E. H. **Bridge-grafting on Citrus.** Monthly Bull. Comm. Hortic. California 2: 72–73. 1919.—Bridge-grafting may be performed on citrus trees as well as on deciduous trees. Seedlings of the sour stock (*Citrus Aurantium*) about $\frac{3}{8}$ inch in diameter were used for the scion wood. The methods employed were those commonly used with deciduous fruits, except that the entire section bridge grafted was wrapped with canvas or burlap to prevent sudden changes of temperature and to lessen the loss of moisture.—*E. L. Overholser.*

1079. Pucci, Angiolo. **Le rose scempie. [Single roses].** Bull. R. Soc. Toscana Orticult. 4: 49–50. 1919.—Popular statement of value of single roses and brief description of seven choice varieties.—*W. H. Chandler.*

1080. Ragionieri, Attilio. **La "Poinsettia (Euphorbia) pulcherrima" futura rivale del Crisantemo. [The "Poinsettia (Euphorbia) pulcherrima" future rival of the chrysanthemum.]** Bull. R. Soc. Toscana Orticult. 4: 29–33. 1919.—Description and advice as to culture and improvement of "*Poinsettia (Euphorbia) pulcherrima.*"—*W. H. Chandler.*

1081. Reyes, Andres L. **Nuevo procedimiento para aumentar el desarrollo de las partes foliaceas en algunas hortalizas, segun el Dr. Mario Calvino. [Method of increasing the development of foliage of some vegetables.]** Revist. Agric. Com. y Trab. 2: 286. *3 fig.* 1919.—Confirms the conclusion of Calvino, that slits in the roots of some vegetables, as chicory, lettuce and parsley, cause a greater development of tops.—*F. M. Blodgett.*

1082. Rolfe, R. A. **Wittia Panamensis.** Curtis Bot. Mag. **15**: *Pl. 8799* (*colored*). 1919. —See Bot. Absts. 3, Entry 2284.

1083. Rolfe, R. A. **Liparis macracantha.** Curtis Bot. Mag. **15**: *Pl. 8797* (*colored*). 1919.—See Bot. Absts. 3, Entry 2283.

1084. Rolfe, R. A. **Calanthe tricarinata.** Curtis Bot. Mag. **15**: *Pl. 8803* (*colored*). 1919.—See Bot. Absts. 3, Entry 2285.

1085. Skan, S. A. **Ipomoea Pes-tigridis var. longibracteata.** Curtis Bot. Mag. **15**: *Pl. 8806* (*colored*). 1919.—See Bot. Absts. 3, Entry 2291.

1086. Taylor, W. H. **Propagation of plants.** New Zealand Jour. Agric. **18**: 93. 1919.—Discusses methods in regard to cuttings generally and illustrates the details by application of the methods to well known plants.—*E. R. Hodson*

1087. Taylor, W. H. **Shelter belts.** New Zealand Jour. Agric. **18**: 165. 1919.—See Bot. Absts. 3, Entry 577.

1088. Taylor, W. H. **The Cape gooseberry.** New Zealand Jour. Agric. **18**: 220. 1919.—Methods of culture are given for this plant (*Physalis edulis*).—*E. R. Hodson.*

1089. Turrill, W. B. **Lonicera similis, var. Delavayi.** Curtis Bot. Mag. **15**: *Pl. 8800* (*colored*). 1919.—See Bot. Absts. 3, Entry 2295.

1090. Turrill, W. B. **Lonicera chaetocarpa.** Curtis Bot. Mag. **15**: *Pl. 8804* (*colored*). 1919.—See Absts. 3, Entry 2296.

1091. Van Fleet, W. **New pillar rose.** Jour. Heredity 10: 136–137. *Fig. 18–19.* 1919.—See Bot. Absts. 3, Entry 1042.

1092. Wheeler, H. J. **Orchard, berry and vegetable fertilizers.** Massachusetts Fruit Growers Assoc. Ann. Rept. 1919: 1–15. 1919.—A reprint without repaging of Massachusetts State Dept. Agric. Circ. 11.

1093. Wheeler, H. J. **Orchard, berry and vegetable fertilizers.** Massachusetts State Dept. Agric. Circ. 11. 15 *p.* 1919.—A popular discussion.

1094. Wright, C. H. **Disporum pullum, var. brunnea.** Curtis Bot. Mag. 15: *Pl. 8807 (colored).* 1919.—See Absts. 3, Entry 1842.

1095. Chenoweth, W. W. **The home manufacture of fruit products.** Massachusetts Fruit Growers Assoc. Ann. Rept. 1919: 1–20. 1919.—A popular discussion reprinted without repaging from Massachusetts Agricultural College, Extension Bulletin 24.

1096. Cruess, W. V. **Lessons for prune growers from the September rains.** Monthly Bull. Comm. Hortic. California 2: 53–60. *Fig. 27–33.* 1919.—With normal seasons, the California prune grower feels no concern regarding probable showers during the drying season. In September of 1918, however, heavy rains fell and were followed by a long period of warm, moist weather resulting in an enormous loss of prunes. The usual methods of handling wet prunes failed because of the adverse weather conditions. Sulfuring of this fruit, however, by exposing it on trays to the fumes of burning sulfur for two hours, checked molding and fermentation and made it possible to dry the fruit satisfactorily. The sulfured product was excellent in flavor and appearance and found a market. Fermented dried prunes can be separated from the sound fruit by flotation in water in a 5 per cent salt solution or a 10 per cent glucose solution. The damaged fruit could be most satisfactorily utilized by feeding it to hogs.—*E. L. Overholser.*

1097. Serre, Paul. **Utilisation des pepins de raisins en Californie. [Utilization of grape seeds in California.]** Compt. Rend. Acad. Agric. France 1919: 150–151. 1919.—Calls attention to the fact that from 3000 to 4000 tons of grape seeds in California there are obtained 550 tons of syrup, 340 to 350 tons of oil, 330 to 340 tons of tannin extracts and 1600 to 2000 tons of stock food.—*E. A. Bessey.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

1098. Abrams, L. R. **A new California cypress.** Torreya 19: 92. 1919.—See Bot. Absts. 3, Entry 1822.

1099. Anonymous. [Rev. of: H. H. Mann. **Variation in flowers of Jasminum malabaricum.** Given before the Linnaean Society. Jour. Bot. 57: 136. 1919.

1100. Arber, A. **On heterophylly in water plants.** Amer. Nat. 53: 272–278. 1919.—Two general types of submerged leaf occur, one ribbon-like and more divided than aerial, other broad and thinner. Author refers to heterophylly in terrestrial angiosperms and juvenile forms of conifers; demands interpretation of heterophylly that will cover all cases. Author recalls observations in *Sagittaria* that aquatic and aerial leaves are differentiated in submerged bud; that first leaves are ribbon-like even when young plant is terrestrial; and that this juvenile type can be induced again in maturity by weakening conditions, such as removal of roots. Also refers to Burns' conclusions on *Proserpinaca palustris* that aquatic condition is not cause of leaf division. For old conception of heterophylly as induced by

aquatic life author would substitute idea that such a difference between juvenile and mature leaves as would render former suitable to aquatic life was prerequisite to migration to water.—*J. P. Kelly.*

1101. Arber, the late E. A. Newell. **Some remarks on the organization of the cones of Williamsonia gigas (L. and H.).** Ann. Bot. **33**: 173–179. *Fig. 1–5.* 1919.—See Bot. Absts. 3, Entry 1143.

1102. Blake, S. F. **Revision of Ichthyomethia, a genus of plants used for poisoning fish.** Jour. Washington [D. C.] Acad. Sci. **9**: 241–252. 1919.—See Bot. Absts. 3, Entry 1823.

1103. Blakeslee, A. F. **A unifoliate mutation in the Adzuki bean.** Jour. Heredity **10**: 153–155. *Fig. 2.* 1919.—See Bot. Absts. 3, Entry 979.

1104. Coulter, J. M. **Seedling of dicotyledons.** [Rev. of: Sinnott, E. W. **Conservatism and variability in the seedling of dicotyledons.** Amer. Jour. Bot. **5**: 120–130. *Fig. 4.* 1918. (See Bot. Absts. 1, Entry 579.)] Bot. Gaz. **67**: 103. 1919.

1105. Farwell, Oliver A. **Cramp bark, highbush cranberry.** Northwestern Druggist **27**: 245–246. 1919.—See Bot. Absts. 3, Entry 1709.

1106. Flury, Philipp. **Ueber Wurzelverwachsungen.** [Root grafting.] Schweiz. Zeitschr. Forstwesen **70**: 37–41. 1919.—See Bot. Absts. 3, Entry 535.

1107. Gertz, Otto. **Kallushypertrofier och några i samband dermed stående anatomiskt-fysiologiska förhallånden hos minerade blad. [Callus hypertrophies and some connected anatomico-physiological conditions in mined leaves.]** Bot. Notiser **1918**: 121–139. 1918.—See Bot. Absts. 3, Entry 1243.

1108. Hitchcock, A. S. **A peculiar species of Lasiacis.** Jour. Washington [D. C.] Acad. Sci. **9**: 35–38. 1919.

1109. Holmes, M. G. **Observations on the anatomy of ash-wood with reference to water-conductivity.** Ann. Bot. **33**: 255–264. *Fig. 1–7.* 1919.—Counts and measurements of vessels in the first annual ring were made throughout several shoots of ash which differed in size and vigor. Calculations were made and curves plotted which made possible a comparison, in regard to the proportion of water conducting elements, between different parts of the same shoot as well as between shoots of different kinds. The chief results are as follows: The total area of the wood and the total number of vessels both decrease from base to apex, the decrease in the former being most rapid at the base. The average diameter of the vessel cavities usually rises slightly and then falls towards the apex; in small weak shoots only the fall is seen. The number of vessels per square millimeter rises and the curve is especially steep at the apex; the figures are very high for weak shoots. The total area of vessel cavities—absolute conductivity—of course falls in all cases; it is highest in the most vigorous shoots and in cases where the apical bud is strongest. The percentage of the area of the wood occupied by vessels—specific conductivity—generally rises and then falls, the maximum occurring nearer the apex of the shoot than the base; the figures are lowest for weak shoots. A comparison is made between the results for the ash and those for the hazel previously studied; the curves are similar but the specific conductivity of ash is much lower than that of hazel.—*W. P. Thompson.*

1110. Lundegardh, Henrik. **Ekologiska och fysiologiska studier på Hallands Väderö. II. Till kännedom om strandväxternas fysiologi och anatomi.** [On the physiology and anatomy of shore-plants.] [Swedish, with English summary.] Bot. Notiser **1919**: 1–39. 1919.

1111. Marie-Victorien, Fr. des E. C. **La vie sexuelle chez les Hydrocharitacées. [Sexual life in the Hydrocharitaceae.]** Naturaliste Canadien 45: 130–133. Mar., 1919.—Author notes M. L.-D. Mignault's statement [See following entry, 1112] that the pollen of *Valisneria spiralis* escapes from the submerged staminate flowers, and rising to the surface fertilizes the pistillate flowers. He then describes the manner of fertilization of another genus of the order, *Philotria Canadensis* (Michx.) Britton. The staminate flowers near the bottom of the water becoming inflated with gas, break off and rise, spreading the pollen grains on the surface of the water where they are supported by the air enmeshed between the minute capillary processes growing out of the outer envelop of the grain. The pistillate flowers are also brought to the surface of the water, but by an extraordinary extension of the perianth. The stigmas are curved so as readily to make contact with the floating pollen.—*A. H. MacKay.*

1112. Mignault, L.-D. **Une plante interessante. [An interesting plant.]** Naturaliste Canadien 45: 101–103. Jan., 1919.—A popular sketch of the form, habitat and habits of *Valisneria spiralis.*—*A. H. MacKay.*

1113. Phillips, R. W. **Note on the duration of the prothallia of Lastraea filix-mas (Presl).** Ann. Bot. 33: 265–266. 1919.—Prothallia growing on pieces of coke were placed in a glass-covered basin on a feebly illuminated shelf. After two years they had grown upright to a height of 15 mm. though only 1 mm. broad. Antheridia were abundant but no archegonia were found. Some were transplanted to suitable conditions and grew normally producing young plants. The remainder were replaced and lived for six years in the unfavorable conditions.—*W. P. Thompson.*

1114. Rowlee, W. W. **Synopsis of the genus Ochroma, with descriptions of new species.** Jour. Washington [D. C.] Acad. Sci. 9: 157–167. 1919.

1115. Small, James. **The origin and development of the Compositae.** New Phytol. 18: 65–89. *Fig. 41–55.* 1919.—See Bot. Absts. 3, Entry 1142.

1116. Weatherwax, P. **The morphological basis of some experimental work with maize.** Amer. Nat. 53: 269–272. 1919.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

1117. Evans, Alexander W. **A new Riccia from Peru.** Torreya 19: 85–88. *1 fig.* 1919. —*Riccia bistriata* sp. nov. is described. This species was collected by Cook and Gilbert at Santa Ana, Peru, June 25, 1915. It is the only adequately published *Riccia* from Peru. It differs from all other Marchantiales in the peculiar bands of thickening which are found in the walls of the green cells. These are illustrated in the figure.—*J. C. Nelson.*

1118. Gertz, Otto. **Anomalier hos rhizoiderna a grodd-knoppar af Lunularia cruciata L. [Anomalies in the rhizoids on the gemmae of Lunularia cruciata.]** [Swedish, with German resumé.] Bot. Notiser 1918: 141–150. *21 fig.* 1918.—The author has made cultures in the following media: distilled water; 0.1 per cent NH_4NO_3; 1 per cent KNO_3; 1 per cent $NaNO_3$; 0.1 per cent glycerin. The anomalies were apparently produced by the toxic effects of the minute quantity of copper contained in the distilled water; by the liberated nitric acid in the NH_4NO_3 solution; and by the liberated potassium and sodium hydrates in the KNO_3 and $NaNO_3$ solutions, respectively. Regarding the anomalies produced in the glycerin solution the author offers no explanation.—*P. A. Rydberg.*

1119. Williams, R. S. **The genus Desmatodon in North America.** Bull. Torrey Bot. Club 46: 207–220. *Pl. 11.* 1919.—A discussion is given of the genus *Desmatodon* with key to, and description of, the following species: *D. latifolius* (Hedw.) Brid., *D. suberectus* (Hook.)

Limpr., *D. Guepini* B. S. G., *D. plinthobius* Sull. & Lesq., *D. obtusifolius* (Schwaegr.) Jur., *D. Porteri* James, *D. systylius* B. S. G., *D. Garberi* Lesq. & James, *D. Sprengelii* (Schwaegr.) Williams, *D. stomatodontus* (Card.) Williams, *D. cernuus* (Hueb.) B. S. G., and *D. Laureri* (Schultz) B. S. G. Of other species which have been referred to the genus, *D. neomexicanus* Sull. & Lesq., *D. nervosus* B. S. G., and *D. Bushii* Card. & Thér. are placed in *Tortula; D. arenaceus* Sull. is reduced to *D. obtusifolius; D. Sartorii* (C. Müll.) Paris is referred to *Leptodontium;* and *D. systylioides* Ren. & Card., to *Pottia.—P. A. Munz.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. Olive, *Editor*

1120. Atkinson, George F. **Collybia campanella Peck, and its near relatives in the eastern United States.** (Rept. of the State Botanist, 1917.) New York State Mus. Bull. **205–206:** 61–65. 1918.—The author gives reasons for the following changes in nomenclature: *Marasmius campanellus* (Pk.) Atkinson & House nov. comb. for *Collybia campanella* Pk., *Marasmius setipes* (Pk.) Atkinson & House nov. comb. for *Collybia stipitaria* var. *setipes* Pk., *Marasmius stipitarius* (Fr.) Atkinson & House nov. comb. for *Agaricus* (*Collybia*) *stipitarius* Fr., and *Marasmius zonatus* (Pk.) Atkinson & House nov. comb. for *Agaricus* (*Collybia*) *zonatus* Pk.—*Alfred H. W. Povah.*

1121. Baccarini, Pasquale. **Funghi etiopici.** Ann. Botanica [Roma] **14:** 117–140. Aug. 30, 1917.—Thirty new species and five new forms and varieties of fungi collected in Eritrea, Northern Abyssinia and the southern Negri region, from the collections of Chiovenda and Pappi are described. The plants are deposited in the herbarium of the Italian colonial department. The new species represent the genera *Lentinus, Trametes, Hydnum, Stereum, Aecidium, Puccinia, Gymnoconia, Ravenelia, Sorosporium, Capnodium, Sphaerella, Rosellinia, Xylaria, Pleospora, Trabutia, Sphaeronema, Phoma, Macrophoma, Melasmia, Coniothyrium, Diplodiella, Haplosporella, Colletotricum,* and *Macrosporium.—J. A. Nieuwland.*

1122. Beardslee, H. C. **The Russulas of North Carolina.** Jour. Elisha Mitchell Sci. Soc. **33:** 147–199, *pl. 70–111.* 1918.—Contains many supplementary notes by W. C. Coker. A few new species described.—*R. M. Harper.*

1123. Beauverie, J. [Rev. of: Vincens, François. **Recherches organogéniques sur quelques Hypocréales.** [**Organogenic researches on some Hypocreales.**] Thèse pour le Doctorat ès Sciences naturelles présentée à la Faculté des Sciences de Paris. *170 p., 3 pl., 71 fig.* L. Declume: Lons-le-Saulnier (Paris?), 1917.] Rev. Gen. Sci. pures et appliquées **30:** 5657. 1919.—The author attempts to work out a better basis for the classification of the Hypocreales and the Pyrenomycetes in general than that now in use. He would discard the characters used by students up to the present time such as the presence or absence of the stroma, its structure, consistence, and the relation of the perithecia to the substratum and even the spore characters although the latter are considered of more value than the former. He hesitates to apply to the Pyrenomycetes characters such as those used by Boudier in the classification of the Discomycetes, i.e., the structure and chemical composition of the ascus, on account of the incompleteness of our knowledge of the morphology of the Pyrenomycetes. In this work, the author seeks merely to discover characters less artificial than those of the stroma and less difficult to apply than those of the spores. He attaches considerable importance to the manner of the disposition of the asci in the perithecia and concludes that this would be a good basis for a revision of the classification of the Pyrenomycetes when we have a detailed knowledge of the development of a sufficiently large number of species.—*Fred J. Seaver.*

1124. Bonar, Lee. The rusts of the Douglas Lake region. Rept. Michigan Acad. Sci. 20: 277–278. 1918.—The writer lists forty rusts collected during the months of July and August, 1917, in a survey of the region about the University of Michigan Biological Station at Douglas Lake, Michigan. [See Bot. Absts. 2, Entry 625.]—*G. H. Coons.*

1125. Chenantais, J.-E. Etudes sur les Pyrénomycètes (2). [Studies of the Pyrenomycetes (2).] Bull. Trimest. Soc. Mycolog. France 35: 46–98. *Fig. 1–8.* 1919.—Under *V*—the author describes *Lasiosphaeria erinacea, Metasphaerica rustica, Lophiostoma striatum, Zignoëlla Hederae, Rosellinia coniochaeta,* and *Otthia alnea.* Under *VI*—the author discusses the genus *Massarinula,* giving a list of species belonging to this genus. Under *VII*—the author takes up the Lasiosordareae, comparing the genera *Lasiosphaeria* and *Hypocopra,* giving a classification of the genera *Lasiosordariella, Lasiosordaria,* and *Lasiosordariopsis.* This is followed by a description of *Lasiosordaria vagans, Lasiosordaria luticola,* and *Lasiosordaria ovina.* Under *VIII*—the author makes some critical remarks relative to the controversy which exists in regard to the appendages of *Podospora.*—*Fred C. Werkenthin.*

1126. Curtis, K. M. A contribution to the life-history and cytology of Synchytrium endobioticum (Schilb.) Percival, the cause of potato wart disease. New Phytol. 18: 90–91. 1919.—A preliminary statement. The resting sporangium gives rise to numerous uniciliate zoospores, which infect the growing potato. Subsequent development of the zoospore leads to the production of smaller zoospores which are said to be facultative gametes, which may infect the host without fusion. Infection by a zygote leads to the formation of a resting sporangium.—*I. F. Lewis.*

1127. Dearness, John, and Homer D. House. New or noteworthy species of fungi. (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 43–59. 1918.—An annotated list of 75 species of fungi of which the following are described as new to science: *Anthostoma peckii* D. & H., *Asterella fraxinina* D. & H., *Aylographum onocleae* D. & H., *Dendrophoma variabilis* D. & H., *Diaporthe artospora* D. & H., *Gloeosporium castanopsidis* D. & H., *Gloniella parvulata* D. & H., *Gloniella vaccinicola* D. & H., *Labrella celastri* D. & H., *Laestadia caricis* D. & H., *Laestadia smilaciniae* D. & H., *Leptostromella chenopodii* D. & H., *Phyllosticta omphaleae* D. & H., *Septoria hedeomae* D. & H., and *Sporodesmium naviculum* D. & H. Two new combinations used are *Phyllachora haydeni* (B. & C.) Dearness and *Rhabdospora mirabilissima* (Pk.) Dearness.—*Alfred H. W. Povah.*

1128. Essig, E. O. New hosts of oak-root fungus in Humboldt County. Monthly Bull. Comm. Hortic. California 2: 79–80. 1919.—See Bot. Absts. 3, Entry 1170.

1129. Gäuman, Ernst. Ein Beitrag zur Kenntnis der lapplandischen Saprolegnieen. [A contribution to the knowledge of the Saprolegniaceae of Lappland.] Bot. Notiser 1918: 151–159. 1918.—Phytogeographical and other notes on *Saprolegnia dioica, S. monoica, S. mixta, S. Thureti, S. lapponica, S. torulosa, S. hypogyna, Achlya prolifera* and *A. racemosa. S. lapponica* Gäuman and *S. mixta v. Asplundii* Gäuman, are described as new. Reference literature, 11 articles.—*P. A. Rydberg.*

1130. Hasselbring, H. Sex organs of Phytophthora. [Rev. of: Murphy, P. A. The morphology and cytology of the sexual organs of Phytophthora erythroseptica Pethyb. Ann. Bot. 32: 115–153. *Pl. 3.* 1918. (See Bot. Absts. 1, Entries 573, 1587.)] Bot. Gaz. 67: 97–98. Jan., 1919.

1131. House, Homer D. New or interesting species of fungi. V. (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 32–42. *Fig. 3–6.* 1918.—An annotated list, containing some descriptions besides those of new species, of about 60 species of fungi. New species and names are: *Humaria peckii* House sp. nov., *Nolanea peckii, Pilosace peckii, Psilocybe cavipes, Sphaerella tsugae,* and *Sphaerella clintoniana.* The following are new combinations: *Bombardia bombarda* (Batsch), *Didymaria didyma* (Ung.), *Eutypa eutypa* (Achar.), *Gnomoniella gnomon* (Tode), *Melogramma melogramma* (Bull.), and *Phlyctaena phlyctaenoides* (B. & C.).—*Alfred H. W. Povah.*

1132. Itano, Arao, and James Neil. Influence of temperature and hydrogen ion concentration upon the spore cycle of Bacillus subtilis. Jour. Gen. Physiol. 1: 421–428. 1919.—See Bot. Absts. 3, Entry 1239.

1133. Lister, G. Mycetozoa recorded as British since 1909. Jour. Botany 57: 105–111. 1919.—Ten years have elapsed since the publication of the first edition of the "Guide to the British species of Mycetozoa." In the preparation of a new edition changes in nomenclature were required to make it agree with the second edition of the "Monograph of Mycetozoa" published in 1911, and also much new information was incorporated. Five genera, 35 species and several varieties have been added to the British list. Notes on the occurrence, discovery, nomenclature, and morphology of these species and varieties are given. *Physarum vernum Somme*, var. *iridescens* is described as new.—*K. M. Wiegand.*

1134. Lloyd, C. G. Letter, No. 69. *16 p.* Apr. 1919. (Cincinnati, Ohio.)—This letter includes the usual acknowledgment of specimens received and miscellaneous notes on a wide variety of fungi, particularly Polyporaceae. A special request is addressed to friends and correspondents asking that fungi be sent to the Lloyd museum. The forms most desired are tremellaceous fungi, Pyrenomycetes and Discomycetes possessing a large fruit-body, Clavarias, Thelephoraceae and Gasteromycetes. A review of Kauffman's "Agaricaceae of Michigan" is appended.—*H. M. Fitzpatrick.*

1135. Moreau, Fernand. Sur une Tuberculariacée parasite du Buis, le Volutella Buxi (Corda) Berk. [A Tuberculariaceae parasite on box, Volutella Buxi.] Bull. Trimest. Soc. Myc. France 35: 12–14. *Fig. 1.* 1919.—The author describes *Volutella Buxi*, which was found on Box in the garden of Château de Fontainebleau in April 1915 among other parasites.—*Fred C. Werkenthin.*

1136. Mulvania, Maurice. A comparison of azotobacter with yeasts. Tennessee Agric. Exp. Sta. Bull. 122. *6 p.* 1919.—A direct comparison is made of the morphological and physiological characteristics of twenty-five strains of *Azobacter* with two species of yeasts. The tables presented show a striking similarity between all the organisms studied, and it is concluded that they are all members of a "narrowly restricted group of organisms." Among the striking features of resemblance are noted the presence of a nucleus and reproduction by buds in both yeasts and *Azotobacter*. These are said not to be met with among bacteria in general. The spores of *Azobacter* resemble spores of yeasts rather than bacteria in regard to heat resistance.—*Maurice Mulvania.*

1137. Overholts, L. O. The species of Poria described by Peck. (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 67–166. *Pl. 1–23.* 1918.—About 20 species of resupinate pore fungi described by Peck are studied microscopically, each species being treated in four sections: (1) Peck's *original description*; (2) *Notes* on the present condition of type material, on characteristics not mentioned by Peck, on explanation of discrepancies, on characteristics and probable relationships of species; (3) *Redescription*, i.e., a combination of the material presented in sections 1 and 2; (4) *Illustrations*. Each species is illustrated as fully as the material permits, three types of illustrations being used: (a) Natural size photographs of type material. (b) Photomicrographs of free-hand sections of the hymenium. (c) Line drawings of spores and hyphae with the aid of camera-lucida. The following species are treated: *Poria attenuata* (Pk.) Cke., *P. attenuata* var. *subincarnata* Pk., *P. aurea* Pk., *Daedalia extensa* Pk., *Poria fimbriatella* (Pk.) Sacc., *P. griseoabla* (Pk.) Sacc. [through typographical error this is given as *P. griseoabla* (Pk.) Sacc.].—*P. indurata* (Pk.) Cke., *P. laetifica* (Pk.) Sacc., *P. macouni* (Pk.) Overholts, *P. marginella* (Pk.) Sacc., *P. nutans* Pk., *P. nutans* var. *tenuis* Pk., *P. myceliosa* Pk., *P. odora* (Pk.) Sacc., *P. ornata* (Pk.) Sacc., *P. pinea* (Pk.) Sacc., *P. radiculosa* (Pk.) Sacc., *P. semitincta* (Pk.) Cke., *P. setigera* Pk., *P. subacida* (Pk.) Sacc., *P. subiculosa* (Pk.) Cke., *P. sulphurella* (Pk.) Sacc., and *Daedalia sulphurella* Pk.—*Alfred G. W. Povah.*

1138. RANOJÉVITCH, NICOLAS. Sur quelques espèces nouvelles de Champignons. [Some new species of fungi.] Bull. Trimest. Soc. Mycolog. France 35: 14–26. *Fig. 1–14.* 1919.—The author collected 203 species of fungi in the Basses-Alpes, 14 species and 3 varieties of which were new to science: *Sphaerella radiata* n. sp., *Pyrenophora Meliloti*, n. sp., *Pyrenophora Pellatii*, n. sp., *Cronartium Euphrasiae*, n. sp., *Placosphaeria Asperulae*, n. sp., *Vermicularis Dematium* (Pers.) Fr. var. *Phalangii*, n. var., *Cytospora Aesculi*, n. sp., *Septoria onobrychnidis*, n. sp., *Septoria monspessulani*, n. sp., *Leptothyrium coronatum* n. sp., *Leptostromella hysterioides* (Fr.) Sacc. var. *Calamagrostidis*, n. var., *Gloeosporium aecidiicola*, n. sp., *Monosporium Centranthi*, n. sp., *Ramulaspera Poterii*, n. sp., *Ramularia Hieracii*, n. sp., and *R. Jacobeae*, n. sp. A detailed description of these fungi and figures within the text are given by the author.—*Fred C. Werkenthin.*

1139. SPRATT, ETHEL R. A comparative account of the root-nodules of the Leguminosae. Ann. Bot. 33: 189–199. *Pl. 13, fig. 1–5.* 1919.—Besides the legumes, two gymnospermous families (Cycadaceae and Podocarpaceae), two dicotyledonous families (Eleagnaceae and Myricaceae), and the genera *Alnus* and *Ceanothus* are said by the author to bear root-nodules containing *Bacillus radicicola.* The root-tubercles of the non-legumes are modified lateral roots, while those of legumes are exogenous in origin. The leguminous nodules are placed in four groups: (1) The Genista type, in which the vascular supply forms one broad zone across the base, and the bacteroidal tissue becomes divided into several parts. (2) The Phaseoleae and Trifolieae type, in which the bacteroidal tissue always remains an undivided central zone. (3) The Viceae type, in which there is a well-defined apical meristem with a basal intercalary zone. Zoogleal infection threads are very prominent in this type. (4) The Mimosoideae type, in which the nodules persist more than one year. The production of slime is connected with the amount of nitrogen fixed, and is influenced by the medium in which the bacteria are living.—*E. W. Olive.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

1140. CHAMBERLAIN, C. J. Fossil plants. [Rev. of: SEWARD, A. C. Fossil plants, a textbook for students of botany and geology. Vol. III. Pterdiospermae, Cycadofilices, Cordaitales, Cycadophyta. 8vo. *xviii + 656 p. Fig. 253.* Cambridge University Press. 1917.] Bot. Gaz. 67: 93–95. Jan., 1919.

1141. KNOWLTON, F. H. Description of a supposed new fossil species of maize from Peru. Jour. Washington [D. C.] Acad. Sci. 9: 134–136. 1919.—A fossilized ear of corn recently received from Peru by the U. S. National Museum is described, and the species named *Zea antiqua.* Although the specimen externally resembles certain living South American types, yet its complete fossilization indicates to the author a possible age of several thousand years, making the date of the first appearance of maize or its ancestors much earlier than is usually believed.—*Helen M. Gilkey.*

1142. SMALL, JAMES. The origin and development of the Compositae. New Phytol. 18: 65–89. *Fig. 41–55.* 1919.—A brief history (1 p.) is given of the theories of various authors, ending with the statement that "the remarkable number of characters which are common to the Lobelioideae and the Compositae leaves very little doubt of the true affinity of the two groups."—A discussion (13 p.) of the theories of evolution, written from the Bergsonian point of view, includes paragraphs on Natural selection, Hybridization, Mutations, Orthogenesis, Epharmosis, and Isolation and Differentiation. Epharmosis is defined as "the act of developing epharmony in Cockayne's sense of the word," which "limits epharmony to adaptations which are the direct result of an environmental stimulus . . . ." Both orthogenesis and epharmosis are emphasized by the author as especially applicable to the Compositae. To orthogenesis is compared the "evolution" of the Uranium-Actinium series in some detail.

The author's conclusion is: "In evolution by *orthogenetic saltation*, with *epharmosis* and *elimination of the unfit* exercising a directing and delimiting function on the actual forms assumed by organized life, we have the best of Darwinism, neo-Lamarckism, neo-vitalism, Mendelism and the mutation theory."—An examination (6 p.) of the characters of the Lobeliodeae leads to the conclusion that this group shows sixteen "characters and tendencies, or lines of orthogenesis, leading towards the Compositae."—The paper closes with a description of the possible origin of the basal genus *Senecio* from such a Lobelioid, as *Siphocampylus*.—*I. F. Lewis.*

1143. Arber, the late E. A. Newell. **Remarks on the organization of the cones of Williamsonia gigas.** (L and H) Ann. Bot. **33**: 173–179. *Fig. 1–5.* 1919.—There are several uncertainties in regard to the exact organization of the cones owing to the fact that the male organs have never been found attached to the axis. From the evidence already available an attempt is made to determine the balance of probability in regard to the chief uncertainties. The following conclusions are reached: (1) The cones were monosporangiate, the female having a conical axis and the male an urn-shaped one. (2) The microsporophylls were borne on the tip of the urn-shaped axis which were therefore of the nature of a gonophore. (3) The axis of the female cone projected beyond the seeds and interseminal scales but bore no organ at its apex.—*W. P. Thompson.*

1144. Sumner, F. B. **Adaptation and the problem of "organic purposefulness."** Amer. Nat. **53**: 193–217. 1919.—Author considers organic adaptation as central problem in evolution and biology in spite of denials by such writers as Livingston that a problem really exists, or of attempts to minimize idea of specific definiteness in adaptive responses by Parker who emphasizes versatility of reactions. Author's analysis leads him to regard adaptive response as secondary phenomenon based on preceding "trial and error" stages or on inherited mechanism due to selection. Vitalists' assumption of entelechy guiding behavior of organisms characterizes as mystical; also indeterministic since given sequence of events may or may not come to pass depending on whim of entelechy.—*J. P. Kelly.*

PATHOLOGY

Donald Reddick, *Editor*

1145. Anonymous. **Orchard pests and diseases: directions for control.** New Zealand Jour. Agric. **18**: 182. 1919.—Formula for principal sprays are given including a table for standardizing home-made lime-sulphur solution.—*E. R. Hodson.*

1146. Anonymous. **Making and applying Bordeaux.** Potato Mag. 1[12]: 6. *3 fig.* 1919.

1147. Anonymous. **Diseases in plantations of exotic trees.** New Zealand Jour. Agric. **18**: 63. 1919.—Plantings of *Betula alba* are reported to be suffering from attacks by *Melampsoridium betulinae;* and *Pinus radiata* has been found injured by *Lophodermium pinastri.* The European larch (*Larix europaea*) is apparently far more susceptible than the Japanese larch (*Larix leptolepis*) to injury from the needle shedding fungus. [See Bot. Absts. 3, Entry 505.]—*N. J. Giddings.*

1148. Anonymous. **Revised compatibility chart of insecticides and fungicides.** New Zealand Jour. Agric. **18**: 39–40. 1919.—Gives chart as revised by G. P. Gray of California.—*N. J. Giddings.*

1149. Anonymous. **The home orchard.** New Zealand Jour. Agric. **18**: 40–44. 1919.—See Bot. Absts. 3, Entry 1051.

1150. Arnould, A. **Dommages causés aux végétaux par les fumées industrielles.** [**Damage caused to plants by industrial fumes.**] Rev. of: Holmes, J. A., E. C. Franklin, and R. A. Gould. **Report of the Selby Smelter Commission.** U. S. Dept. Interior, Bur. Mines Bull.

98: 1–528. *41 pl., 14 fig.* 1915.] Rev. Eaux et Forêts 57: 121–125. 1919.—The effects on vegetation of the fumes given off by the smelter of the Selby Smelting and Lead Company in Solano County, California, were exhaustively studied by a large staff of experts. Greater difficulty was found in determining the effect of sulphurous acid on trees than on annual crops such as cereals. As a result of changes installed by the Company, the Commission was able to state that there was no further danger of damage to vegetation or to the health and comfort of the inhabitants. Both the report and investigation are worthy of imitation by French authorities in the reconstruction of factories in the devastated regions of France. It would be desirable for the State to require in new installations the purification or neutralization of all liquid or gaseous residues before they leave the works. [See Bot. Absts. 3, Entry 513.]—*S. T. Dana.*

1151. Artschwager, Ernst F. **Histological studies on potato leaf-roll.** Jour. Agric. Res. 15: 559–570. *Pl. C and 35–45.* 1918.—Potato plants of European and American origin affected with leafroll were examined critically and are compared with healthy plants. [See Bot. Absts. 2, Entry 67.]—*D. Reddick.*

1152. Ashby, S. F. **Budrot of coconuts.** Jour. Jamaica Agric. Soc. 23: 23–25. 1919.—As insurance against budrot the author advises selection of nuts from disease-free trees, rejection of any showing rot, destruction of all nuts not germinating within a reasonable time, and the application of Bordeaux paste to the stalk end of the nuts before planting.—*John A. Stevenson.*

1153. Ashby, S. F. **Late blight of Irish potatoes.** Jour. Jamaica Agric. Soc. 23: 10–16. 1919.—A popular account of the symptoms and etiology of the disease. Most of the infection in Jamaica is due to planting of diseased tubers. Temperature and moisture relations account for infection of the winter crop in Jamaican lowlands and freedom from disease in the uplands. Summer crop is not often blighted due to higher mean temperatures. Bordeaux or Burgundy mixtures are recommended.—*John A. Stevenson.*

1154. Barrus, M. F. **Seed improvement and certification.** Potato Mag. 1^{10}: 10, 25, 34. *1 fig.* 1919.—See Bot. Absts. 3, Entry 919.

1155. Batten, Lily, and Hubert W. Bywaters. **Occurrence of mould in coacoa butter.** Amer. Jour. Pharm. 91: 112–115. 1919.—The authors report the presence of *Penicillium glaucum*, a pink yeast, and what was believed to be *Aspergillus oryzae* in a 28 pound block of cocoa butter. As cocoa butter is distinguished among fats by its resistance to influences tending to produce rancidity and mouldiness, the authors deemed it noteworthy to determine the nature of the fungus present. On breaking open the block of cocoa butter, drops of a clear liquid, apparently water, were observed to be present in some of the larger vesicles. Cultural experiments were then made with *Aspergillus* to note conditions which were favorable for the growth of this fungus on cocoa butter. The authors report that cocoa butter would not become mouldy if kept free from water, but, if water finds its way into cocoa butter and especially if the water contains substances probably of a nitrogenous nature, which can serve as food for the fungus, then there is real danger of the cocoa butter becoming mouldy. (Reprinted from the Journal of the Society of Chemical Industry, July, 1918.)—*Anton Hogstad Jr.*

1156. Bessey, Ernst A., and Walter K. Makemson. **Notes on the control of rye smut.** Rept. Michigan State Bd. Agric. 1917: 305–307. 1917 (1918).—Rye was infected with *Urocystis occulta* by rolling seed in spores before planting thus demonstrating that infection takes place at the time of germination or shortly thereafter. Formaldehyde treatment of seed prevented disease entirely.—*G. H. Coons.*

1157. Brann, F. R. **Factors concerning the drop of immature citrus fruit in central California.** Monthly Bull. Comm. Hort. California 2: 74–75. 1919.—See Bot. Absts. 3, Entry 1057.

1158. Bruner, S. C. **Caida de las nueces e inclinacion de las hojas del cocotero en Cuba. [Nut fall and leaf droop of coconuts in Cuba.]** Revist. Agric. Com. y Trab. 2: 96. 1919.—In the December (1918) number of the *Cuba Review* Fox erroneously locates the above named disease in Cuba, perhaps mistaking the bud rot for it.—*F. M. Blodgett.*

1159. Bruner, S. C. **Un honguillo parasito del tincitido de la higuereta. [A fungus parasite of an insect on the castor bean.]** Revist. Agric. Com. y Trab. 2: 218.–219 1919.—Insects, *Corythuca gossypii*, of the castor bean were found to be affected by the fungus *Sporotrichum globuliferum*. Artificial inoculations were successful, but it was thought that as a commercial means of control it would be no more successful than against the chinch bug in the United States.—*F. M. Blodgett.*

1160. Bruner, Stephen C. **La preparación del caldo bordelés. [Preparation of Bordeaux mixture.]** Revist. Agric. Com. y Trab. 2: 62–63. *1 fig.* 1919.

1161. Clark, C. F. **The potato industry in Colorado.** Potato Mag. 1^{11}: 8–9, 22; 1^{12}: 14–15, 29. *8 fig.* 1919.—See Bot. Absts. 3, Entry 920.

1162. Clinton, G. P. **Prematuring and wilting of potatoes.** Potato Mag. 1^{12}: 12–13, 24. 1919.—Discusses malnutrition due to potash deficiency, with regard to effects, contributing factors, and control methods.—*Donald Folsom.*

1163. Condit, I. J., and H. J. Stevens. **"Die-back" of the fig in California.** Monthly Bull. Comm. Hortic. California 2: 61–63. *Fig. 31–35*, 1919.—There have been identified two forms of die-back of the fig tree in California. One form is described as showing small pustules of a fungus which encircles the limb just below the new growth on the older wood. When such limbs are split longitudinally a distinct darkened and discolored area is present at the point where the sporulating pustules were found. The branch dries out and becomes very hard and brittle with the bark closely attached. A *Botrytis*, probably *Botrytis cinerea*, is believed to be the causal organism. Field observations indicate that infection starts in the fruit, and the mycelium after penetrating the fig works its way down into the wood. At this point it comes to the surface and produces conidiophores. It remains local and kills only that portion. In pure cultures, the junior author found conidiophores were produced in eight to ten days in either prune or plain nutrient agar.—The second form exhibits no fruiting bodies on the outside of the limbs, but shows, when split open, a shrinking of the pith and the presence of sclerotia of various shapes and ranging in size from a small pea to a body 12 to 15 mm. in length and 5 or 6 mm. in width. The bark becomes softened and shreds off. The inner tissues are softened and pithy in texture. This trouble is caused by a *Sclerotinia*, probably *Sclerotinia libertiana*. A theory is offered concerning the method of infection, in that following frost damage, the tips of the limbs become susceptible, and that during the cold, damp days following, apothecia may be formed from sclerotia lying in dead twigs or on the ground and spores set free which are blown to the leaves and twigs by the wind. The sclerotia germinate well in both plain nutrient, and prune agar, and small sclerotia can be seen forming within nine days.—*E. L. Overholser.*

1164. Coons, G. H. **A Phoma disease of celery.** Rept. Michigan State Bd. Agric. **1917**: 485–496. 1917 (1918).—Reprint Michigan Special Bulletin No. 81, being a popular presentation of the facts concerning this disease.—*G. H. Coons.*

1165. Coons, G. H. **Report to the Botanist.** Rept. Michigan State Bd. Agric. **1917**: 297–303. 1917 (1918).—The writer reports plant pathological work carried out during the fiscal year ending July 1, 1917. Experiments on control of grain smut, celery diseases, and transportational diseases are reported. The production of anaphylactic shock in guinea-pigs with Fusariums of various species is reported. Experiments on the control of smut diseases using the concentrated formaldehyde method are given. *Fusarium oxysporum* is reported as invading the root system of potatoes following death of roots by drought. The introduction of black leg of potato (*Bacillus*) into the Lower Peninsula is described.—*G. H. Coons.*

1166. COONS, G. H. Notes on Michigan plant diseases in 1916. Rept. Michigan State Bd. Agric. 1917: 310–317. 1917 (1918).

1167. COONS, G. H. Oat smut. Rept. Michigan State Bd. Agric. 1917: 308–309. 1917 (1918).—Popular presentation of the facts concerning oat smut.—*G. H. Coons.*

1168. COONS, G. H. The relation of weather to epidemics of late blight of potato. Rept. Michigan State Bd. Agric. 1917: 317–318. 1917 (1918).—Rainfall conditions in the first half of the growing season influence severity of late blight of potatoes, caused by *Phytophthora infestans*, and from this arises the possibility of predicting when epiphytotics threaten.—*G. H. Coons.*

1169. DUTTON, W. C. Dusting and spraying experiments with apples. Michigan Agric. Exp. Sta. Special Bull. 87. *24 p. Fig. 1–6.* 1918.—Reports three years' experience in spraying and dusting apples to control apple scab (*Venturia inaequalis*) with tables on cost of materials and applications. In two years out of three, dusting gave satisfactory scab control, while in the one year dusting failed almost entirely to control apple scab. Standard lime-sulphur solution gave better control than "dry lime-sulphur." An application of fungicide made when the flower buds were "pink" did not give increased freedom from scab.—*G. H. Coons.*

1170. ESSIG, E. O. New hosts of oak-root fungus in Humboldt County. Monthly Bull. Comm. Hortic. California 2: 79–80. 1919.—The old roots of stumps of the redwood (*Sequoia sempervirens*) and the roots of the wild hazel (*Corylus rostrata* var. *californica*) are reported as being host plants for the oak-root fungus (*Armillaria mellea*).—*E. L. Overholser.*

1171. FERNOW, B. E. Blister rust control. [Rev. of: ANONYMOUS. Report on white pine blister rust control, 1918. American Plant Pest Committee Bull 2. *16 p.*] Jour. Forestry 17: 325–326. 1919.—See Bot. Absts. 3, Entry 532.

1172. F[OSTER], J. H. Rev. of: RANKIN, W. HOWARD. Manual of tree diseases. *398 p.* Macmillan Co.: New York, 1918.] Jour. Forestry 17: 321. 1919.

1173. FRANCIS, W. Orchard pests and how to combat them. Jour. Agric. S. Australia 21: 951–954. 1918.—Scab of apricot, leaf curl of peaches and prunes, black spot of apples and pears.—*D. Reddick.*

1174. FROMME, F. D., AND S. A. WINGARD. Bean rust: its control through the use of resistant varieties. Virginia Agric. Exp. Sta. Bull. 220. *18 p., pl. 1–5.* 1918. [1919.]—Rust (*Uromyces appendiculatus*) is an important disease of beans (*Phaseolus*) in Virginia with losses especially heavy on pole beans and on bush beans grown for dry-shell purposes. Kentucky Wonder (pole) and Tennessee Green Pod (bush) are the varieties most commonly injured in gardens and Navy Pea in fields. Defoliation following an attack of rust may result in total loss of the crop. Different varieties, some 80 of which were tested, showed marked variation in susceptibility. Varieties are classified according to relative susceptibility as rust-free, rust-proof, rust-enduring, and rust-susceptible. Rust may be eliminated as a factor in production by use of the non-susceptible varieties which are recommended.—*F. D. Fromme.*

1175. HIGGINS, B. B. Gum formation with special reference to cankers and decays of woody plants. Georgia Agric. Exp. Sta. Bull. 127: 23–59. *Pl. 1–6, fig. 1–15.* 1919.—See Bot. Absts. 3, Entry 1230.

1176. HORNE, W. T. Oak-fungus, oak-root fungus disease, fungus root-rot, toadstool root-rot or mushroom root-rot. Monthly Bull. Comm. Hortic. California 2: 64–68. *Fig. 36–39.* 1919.—The importance, symptoms, cause, characteristics, and control of the oak-root fungus (*Armillaria mellea*) and the utilization of infested areas are discussed. Nearly all trees and shrubs may be attacked. The fungus is rather slow-acting and hence, annual or short-lived

crops are not seriously injured; also plants with fine, slender roots are not much affected owing to the habit of the fungus of developing in roots of some thickness. The "French pear" is apparently immune while the trees are growing healthily, and black walnut and fig are considered highly resistant. Apples are more resistant than stone fruits and Myrobolan plum is apparently somewhat more resistant than peach or almond.—*E. L. Overholser.*

1177. Laffer, H. E. **Diseases of the vine.** Jour. Agric. South Australia **21**: 462–471. *7 fig.* 1918.—Anthracnose or black spot, caused by *Manginia ampelina*. The disease and the organism are illustrated and described following closely the work of Viala and Pacottet.—Sultana is the most susceptible variety, and is followed by Waltham Cross. Shiraz and Mataro appear to be almost immune.—*D. Reddick.*

1178. Link, G. K. K. **Potato losses in transit.** Potato Mag. 1^{10}: 5–7, 26–27. *3 fig.* 1919.—Discusses causes, importance, control, and market inspection service.—*Donald Folsom.*

1179. Mangin, Vincey, Haller and Henneguy. **Le dépérissement des Épicéas dans la vallée de l'Arve. (Chedde et Chamonix). [Discussion on death of spruces in the Arve valley.]** Compt. Rend. Acad. Agric. France **1919**: 113–115. 1919.—The death of eight-tenths of the spruces in the region of Chedde and Chamonix in the valley of the Arve is probably due to the chlorine fumes escaping from the factories there during the manufacture of various chemicals for war uses.—*E. A. Bessey.*

1180. Miller, Justus. **Northern Ontario seed potato trade.** Potato Mag. 1^{11}: 5, 33–34. 1919.—See Bot. Absts. 3, Entry 881.

1181. Moreau, Fernand. **Sur une Tuberculariacée parasite du Buis, le Volutella Buxi (Corda) Berk. [A Tuberculariaceous parasite on box, Volutella Buxi.]** Bull. Trimest. Soc. Myc. France **35**: 12–14. *Fig. 1.* 1919.—See Bot. Absts. 3, Entry 1135.

1182. Muncie, J. H. **Report to the Botanist.** Rept. Michigan State Bd. Agric. **1917**: 303–304. 1917 (1918).—Experimental work in the control of bean diseases are outlined. Review of Michigan Techincal Bulletin 38.—*G. H. Coons.*

1183. Muncie, J. H **Experiments on the control of bean anthracnose and bean blight.** Michigan Agric. Exp. Sta. Tech. Bull. 38. *50 p., 4 pl.* 1917 (1918).—A consideration of the control measures of *Colletotrichum lindemuthianum* and *Bacterium phaseoli.* Diseases are recognized as being seed borne and spread during wet weather by cultivation. Thermal death point for the spores of *Colletotrichum lindemuthianum* lies between 45 and 48°, while old mycelium will endure exposure for ten minutes in liquid culture at 65°.—Both organisms may be carried to the field in bean trash or manure containing bean trash, but neither organism survives passage through the alimentary tract of cattle.—Negative results are reported in the use of chemical solutions and wet and dry heat for the control of the diseases.—Successful experiments in the use of seed of Michigan origin grown for a year in the arid West are reported. Control measures based on this practise are recommended. The article has a bibliography of 50 titles.—*G. H. Coons.*

1184. Murphy, P. A. **Seed potato inspection service in Canada.** Potato Mag. 1^{10}: 8, 28, 31. *7 fig.* 1919.—See Bot. Absts. 3, Entry 918.

1185. Neger, F. W. **Die wahre natur der russtaupilze. [True nature of sooty molds.]** Naturwissensch. **6**: 30–32. 1918.

1186. Orton, C. R., and F. D. Kern. **The potato wart disease: A new and serious disease recently discovered in Pennsylvania.** Pennsylvania Agric. Exp. Sta. Bull. 156. *16 p., 4 fig.* 1919.—Part I includes a brief discussion of the history of potato wart and its discovery in America; the symptons of the disease, its distribution in Pennsylvania and a discussion of preventive measures. Part II discusses the cause of the disease, *Chrysophlyctis endobio-*

tica, the life history of the fungus including observations on the "primary nucleus" and the anatomy of the diseased tissues. It is pointed out that the so called "primary nucelus" may be the host nucleus which has been surrounded or engulfed by the parasite within the cell and that the warty growths are composed largely of fundamental and vascular tissues constituting a hyperplastic overgrowth.—*C. R. Orton.*

1187. Orton, W. A. **Protect seed potatoes against disease.** Potato Mag. 1[11]: 6–7. *Fig. 1–6.* 1919.—Indicates value of protection and describes methods for it.—*Donald Folsom.*

1188. Paynter, L. **Control of black-spot of pear.** New Zealand Jour. Agric. 18: 221. 1919.—The results and costs of spraying tests are given for control of this disease (*Fusicladium pyrinum*).—*E. R. Hodson.*

1189. Petri, L. **Le galle del "Capparis tomentosa" Lam. prodotte dalla "Discella capparidis" Pat. et Har. [Galls of Capparis caused by Discella.]** Ann. Botany [Roma] 14: 141–150. *3 fig., 1 pl. (colored).* 1917 (1918).—From the microscopic examination of sections free hand and from paraffin embeddings the author concludes that the excrescences on the stems and leaves of *Capparis tomentosa* are caused by *Discella capparidis.* Penetration of the mycelium into the cells of the host causes the gradual substitution of the plasmic contents. The leaf galls are not different histologically than those of the stems. Harmonious relationship of the symbionts does not exclude real parasitism.—*J. A. Nieuwland.*

1190. Petri, L. **Nuove vedute sulle cause dell' arricciamento della vite. [New views on the cause of "arricciamento" of the grape.]** Atti R. Accad. Lincei (Rend. Cl. Sci. fis. mat. e nat.) V, 27[2]: 271–275. *1 fig.* 1918.—This disease is believed to be infectious as healthy cuttings grown in infected soil contract the disease. When grown in the same soil after sterilizing at 120°C. the disease did not appear. Infected vines did not recover in five years even when grown under best conditions. When affected vines are replaced by healthy vines, the new vines are soon affected. Washings from soil around affected vines carry disease but when filtered through Kitasato filter no longer carry it. The disease is characterized by certain abnormalities in the growth of the roots some of the cells of which are penetrated by a microorganism which presents the morphological characters of a plasmodium.—*F. M. Blodgett.*

1191. Rant, A. **The white root-fungus of cinchona.** Recueil Trav. Bot. Néerland. 14: 143–148. *1 pl.* 1917.—Two root-fungi distinguished as white and gray are referred to. By means of pure cultures and infection experiments it was demonstrated that the gray root-fungus of *Cinchona* belongs to the genus *Rosellinia* and produces *Graphium* as a lower fructification both naturally and in culture.—The white fungus attacks usually trees of older growth of *C. ledgeriana* and *C. robusta.* On the external side of the bark, black rhizomorphs resembling *Armillaria mellea* of Europe are found. The plant is *Armillaria mellea* (Vahl) Quél. var. *javanica* P. Henn. Methods for the preparation of pure cultures are emphasized and the precautions necessary explained. A dilute agar-glucose-peptone-potassium acid phosphate was used; moss, living twigs of *Acer pseudoplatanus* and water for other substrata.—*J. A. Nieuwland.*

1192. Roberts, John W., and Leslie Pierce. **Control of cherry-leaf spot.** U. S. Dept. Agric. Farmers Bull. 1053. *8 p.* 1919.

1193. Sanborn, C. B. **Oklahoma and certified seed.** Potato Mag. 1[12]: 23. 1919.

1194. Savastano, L. **Sul marciume radicale negli agrumeti italiani. [On root rot of the Italian citrous orchards.]** Boll. R. Staz. Sperim. Agrum. e Frutt. Acireale 35: 1–8. 1919.—This is a complex form of disease due to divers pathologic causes acting singly or in combination. These causes may be divided into two groups: (1) organic, among which should be classed bacteria (pathogenic or non-specifically pathogenic) and lower fungi; (2) physical, among which should be classed root asphyxia due to excessively compact soil and subsoil and stagnant water. Besides these apparently immediate causes the following seem to be condi-

tions which favor the particular behaviour of the diseased trees: (1) compact subsoil; (2) diminished resitance of the bitter orange; (3) overcrowding of the trees in the orchard; (4) excessive and irrational irrigation; (5) excessive manuring, a cause that acts by destroying the normal balances in the plants; (6) special cultural practices aiming at the "forcing" of the trees. The author states that investigations are under way for the trial of *Citrus trifoliata* and *C. limonellus* as subjects to the grafting of orange and lemon respectively.—*A. Bonazzi.*

1195. Schoevers, T. A. C. **Proeven met eenige chemicalien ter bestrijding van het wortelaaltje (Heterodera radicicola Greef). [Experiments with chemicals for the control of Heterodera radicicola.]** Meded. Landbouwhoogeschool, Wageningen **15**: 85–88. 1918.—The author reports results of further experiments on the control of the root-knot nematode, *Heterodera radicicola* by applying various chemicals to pots of infested soil. He states that on the roots of tomato plants grown in those pots treated with formaldehyde and with lime mixed with ammonium sulphate no infection was found, but that slight infection occurred where naphthaline and carbolineum were applied. The other chemicals tested did not appreciably reduce infection.—*L. P. Byars.*

1196. Spafford, W. J. **Wheat and its diseases.** Jour. Agric. S. Australia **21**: 947–949. 1918.—The smuts, rust and take-all are described.—*D. Reddick.*

1197. Sternon, F. **Une maladie nouvelle du Dahlia. [New disease of dahlia.]** 5 *p.*, 1 *pl.* Bruxelles, 1918.—A leaf spot of Dahlia, attributed to *Entyloma Calendulae* which appeared at Gembloux, Belgium, is marked by scattered, sparse, 5 to 7 mm. discolored areas, which later enlarge and become confluent. These spots contain great numbers of double-walled chlamydospores about 13μ in diameter with remarkably refrangible contents. These spores germinate and form a promycelium with four basidiospores. No conida were observed.—*W. A. Orton*

1198. Taylor, W. H. **Silver-leaf disease in fruit trees.** New Zealand Jour. Agric. **18**: 88. 1919.—It is stated that silver-leaf or silver blight (caused by *Stereum purpureum*, a wound parasite) is one of the most formidable diseases which orchardists have to encounter and that no cure has been found. Drastic treatment in early stages by severe pruning, and in later stages by removing and destroying the trees including the roots, is advised.—*E. R. Hodson.*

1199. Tunstall, A. C. **Tea roots. II.** 17 *p.*, 7 *pl.* India Tea Association, 1918.—Diseases of tea roots caused by the fungi, *Hymenochaete noxia, Ustulina zonata, Rosellinia bothrina, Sphaerostilbe repens,* and *Thyradaria tarda,* result often in great losses. Symptoms of each disease are listed, followed by a detailed description of fungus and host relations. All the fungi are partly saprophytic, living as such mostly on dead stumps; hence are most abundant in forest areas. *Thyradaria tarda, Ustulina zonata,* and *Hymenochaete noxia* cause greater loss in sandy soil, while *Rosellinia* sp. and *Sphaerostible repens* have been observed only in heavy soils. All the fungi excepting *Thyradaria* may spread through the soil. Control measures: Encircle diseased plants with a trench and surrounding plants by a second trench. Remove and burn roots, add lime to soil where plants are attacked by *Rosellinia* sp. and *Sphaerostilbe repens,* and treat wounded or pruned surface in gardens where plants are diseased with *Thyradaria.*—*J. I. Lauritzen.*

1200. Vermorel and Dantony. **Les bouillies sulfo-calciques. [Lime-sulfur sprays.]** Compt. Rend. Acad. Agric. France 1919: 161–164. 1919.—The various lime-sulfur sprays contain in solution hyposulfite, tetrasulfide, pentasulfide and oxysulfides of lime; the sediments contain sulfur, lime, sulfite of lime, sulfate of lime, and oxysulfide of lime. The relative proportions depend upon the temperature and length of boiling, proportion of lime and sulfur, amount of water, length of cooling, surface exposed to the air, impurities in the lime, etc.—*E. A. Bessey.*

1201. Weir, James E., and Ernest E. Hubert. **The influence of thinning on western hemlock and grand fir infected with Echinodontium tinctorium.** Jour. Forestry **17**: 21–35. 1919.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

1202. WAKEMAN, NELLIE. Teaching plant chemistry. Jour. Amer. Pharm. Assoc. 8: 105–108. 1919.—See Bot. Absts. 3, Entry 922.

DIFFUSION, PERMEABILITY

1203. LOEB, JACQUES. The influence of electrolytes on the electrification and the rate of diffusion of water through collodion membranes. Jour. Gen. Physiol. 1: 717–745. 1919.—The author's experiments indicate that the diffusion of water through a collodion membrane depends on two kinds of forces, namely, first, those of gas pressure, and second, electrical forces. Solutions of neutral salts possessing a univalent or bivalent cation influence the rate of diffusion of water through a collodion membrane as if the water particles were charged positively. The attractive and repulsive action increases with the number of charges of the ion and diminishes inversely with a quantity the author designates arbitrarily as the "radius" of the ion. The same rule applies to solutions of alkalies. "Solutions of neutral or acid salts possessing a trivalent or tetravalent cation influence the rate of diffusion of water through a collodion membrane as if the particles of water were charged negatively." Solutions of acids obey the same rule, the high electrostatic effect of the hydrogen ion being probably due to its small "ionic radius."—*J. M. Brannon.*

1204. LOEB, JACQUES. Amphoteric colloids. IV. The influence of the valency of cations upon the physical properties of gelatin. Jour. Gen. Physiol. 1: 483–504. 1919.—A method of preparing metal gelatinates is indicated. The author finds that the osmotic pressure of a one per cent solution of gelatinates with univalent cations is almost exactly three times as great at the same P_H as that of gelatinates with bivalent metals. The conductivities of the solutions of the two types of gelatin differ little or not at all. From experimental evidence given the author concludes that the proximity of the conductivities of metal gelatinates with univalent and bivalent metal excludes the possibility that the differences observed in osmotic pressure, viscosity, and swelling between metal gelatinates with univalent and bivalent metal are determined by differences in the degree of ionization. An explanation is offered, based on the hypothesis that aggregates of gelatin anions are formed with a single negative charge.—*J. M. Brannon.*

1205. LOEB, JACQUES. Amphoteric colloids. V. The influence of the valency of anions upon the physical properties of gelatin. Jour. Gen. Physiol. 1: 559–580. 1919.—The ratio of maximal osmotic pressure of a one per cent solution of gelatin sulfate and gelatine bromide is about 3 : 8. This same ratio was found for the ratio of maximal osmotic pressure of calcium and sodium gelatinate. It was found that twice as many molecules of HBr as of H_2SO_4 combined with a given mass of gelatin. It is also shown in this paper that the same number of molecules of phosphoric, citric, oxalic, tartaric, and succinic acids as of HNO_3 or HCl combines with the same mass of gelatin. Gelatin sulfate and gelatin bromide solutions of the same P_H have practically the same conductivity. This, the author thinks, disproves the assumption of colloid chemists that the difference in the effect of bromides and sulfates on the physical properties of gelatin is due to a different ionizing and hydrating effect of the two acids upon the protein molecule.—*J. M. Brannon.*

1206. OSTERHOUT, W. J. V. A comparison of permeability in plant and animal cells. Jour. Gen. Physiol. 1: 409–413. 1919.—A striking agreement is shown between frog skin and plant tissues in respect to certain aspects of permeability, antagonism, injury, recovery, and death.—*J. M. Brannon.*

1207. Osterhout, W. J. V. **Antagonism between alkaloids and salts in relation to permeability.** Jour. Gen. Physiol. 1: 515–519. 1919.—The alkaloids studied were nicotine, caffeine, and cevadine. Nicotine antagonizes the action of NaCl by inhibiting the fall of resistance which occurs in pure NaCl. Caffeine gives similar results. The tissues (*Laminaria*) die in cevadine in eighteen hours or less. In the case of caffeine (0.01–0.04 M) and of cevadine sulfate (0.0006–0.0025 M) a distinct decrease in permeability was found, followed by an increase. Nicotine gave a visible precipitate when added to water.—*J. M. Brannon.*

WATER RELATIONS

1208. Holmes, M. G. **Observations on the anatomy of ash-wood with reference to water-conductivity.** Ann. Bot. 33: 255–264. *Fig. 1–7.* 1919.—See Bot. Absts. 3, Entry 1109.

MINERAL NUTRIENTS

1209. Calvino, Mario. **Alta horticultura, las inyecciones interorganicas eñ las plañtas. [Inorganic injections in plants.]** Revista Agric. Com. y Trab. 2: 287–288. *7 fig.* 1919.—See Bot. Absts. 3, Entry 1060.

METABOLISM (GENERAL)

1210. Appleman, Charles O. **Action of neutral salts on acid inversion of cane sugar.** [Rev. of: Lebert, M. **Action des sels neutres sur l'inversion du sucre par les acides.** Rev. Gen. Bot. 30: 241–244. 1918.] Bot. Gaz. 67: 98–99. Jan., 1919.

1211. Appleman, Charles O. **Effect of different oxygen pressures on carbohydrate metabolism of sweet potatoes.** [Rev. of: Hasselbring, Heinrich. **Effect of different oxygen pressures on the carbohydrate metabolism of the sweet potato.** Jour. Agric. Res. 14: 273–284. 1918—(See Bot. Absts. 1, Entry 1399).] Bot. Gaz. 67: 99–100. Jan., 1919.

1212. Appleman, Charles O. **Physiological rôle of glucosides in plants.** [Rev. of: Combes, Raoul. **Recherches biochemiques experimentales sur le rôle physiologique des glucosides chez les végétaux.** Rev. Gén. Bot. 30: 226–237, 245–257. 1918. (See Bot. Absts. 3, Entry 439).] Bot. Gaz. 67: 101–102. 1919.

1213. Brown, O. W., and L. L. Carrick. **Catalytic preparation of the amidophenols and the phenylenediamines.** Jour. Amer. Chem. Soc. 41: 436–440. 1919.

1214. Crozier, W. J. **Intracellular acidity in Valonia.** Jour. Gen. Physiol. 1: 581–583. 1919.—The cell-sap of *Valonia* is much more acid than the sea water in which the plant is living. The acidity of fifty cells varied in individual cases from Ph 5.01 to 6.7. The effect of exposure to darkness could not be detected in the reaction of the sap. *Valonia* quickly increases the alkalinity in the surrounding medium by abstraction of CO_2. There may develop an external alkalinity of Ph 9.5 or greater, but the internal acidity is maintained. It has been previously shown that sap from dead *Valonia* cells contained SO_4, while healthy cells do not. In *Valonia* natural death of a cell consumes some time, the change in the acidity of the cell-sap, paralleled by the change in permeability to SO_4, being a gradual process.—*J. M. Brannon.*

1215. Fred, E. B., and A. R. C. Haas. **The etching of marble by roots in the presence and absence of bacteria.** Jour. Gen. Physiol. 1: 631–638. 1919.—The authors found that the etching power of roots increased in the presence of bacteria.—*J. M. Brannon.*

1216. Gertz, Otto. **Laboratorietekniska och microkemiska notiser. 3. Om kristallisrrande bladpigmenter hos Heracleum-arter och hos Strobilanthes Dürianus. [On crystallizing leaf-pigments in species of Heracleum and in Strobilanthes Dürianus.]** [Swedish, with Ger-

man resumé.] Bot. Notiser 1918: 49–58. *Fig. 1–2.* 1918.—The species of *Heracleum* treated are: *H. granatense*, *H. eminens*, *H. villosum*, and *H. pyrenaicum*. In all, the pigment contains carotin, which crystallizes when treated with alcohol or acetone.—*P. A. Rydberg.*

1217. Hackh, Ingo W. D. **Bioelements. The chemical elements of living matter.** Jour. Gen. Physiol. 1: 429–433. 1919.—A table is given showing the distribution of the bioelements in some living organisms and food; also, one showing distribution of chemical elements.—*J. M. Brannon.*

1218. Hasselbring, H. **Physiology of fungi.** [Rev. of: Duggar, B. M., J. W. Severy, and H. Schmitz. Studies in the physiology of fungi. Ann. Missouri Bot. Gard. 4: 165–173, 279–288. 1917.] Bot. Gaz. 67: 102. 1919.

1219. Hemmi, Fumiwo. **On the carbohydrates of the edible tubers of Japan.** Jour. Coll. Agric. Hokkaido Imp. Univ. 8: 33–76. 1918.—Six edible tubers of Japan were analyzed. In addition to the analyses for water, protein, fat, crude fiber, and nitrogen, the tubers were carefully analyzed for carbohydrate content, many tests being employed. Starch was most abundant (58 per cent to 71 per cent of dry matter); sugar (1.4 per cent to 16.6 per cent). Of the sugars, sucrose and glucose were most abundant, while fructose was present in small amounts in some tubers. Galactan and araban were also found to be present. The tubers of the following species were used: *Apios Fortunei* Maxim., *Colocasia antiquorum* Schott., *Corydalis ambigua* Cham. & Sch., *Dioscorea Batatas* Decne., *Eleocharis plantaginea* R. Br., and *Helianthus tuberosus* L. These include all edible tubers of Japan not previously analyzed. —*R. S. Nanz.*

1220. Henderson, L. J., Edwin J. Cohn, P. H. Cathcart, J. D. Wachman, and W. O. Fenn. **A study of the action of acid and alkali on gluten.** Jour. Gen. Physiol. 1: 459–472. 1919.—The authors venture the conclusion that in systems containing gluten and acids or bases the formation of salts, in accordance with the requirements of the mass law, is the fundamental phenomenon. They introduce the term "salt conductivity" which represents the effect of all other ions than those which may be hypothetically attributed to free HCl. Also the term "corrected salt conductivity" is used. This represents the effects of the action of the acid to increase conductivity, aside from the direct effect of the ions arising from those molecules of acid which remain free in the solution. This is compared with the total amount of acid which has disappeared from the solution. In some of the tables this comparison, in the form of a ratio, is designated R. From the tables there is seen to be a rough constancy of the ratio of corrected salt conductivity to combined acid. This does not hold true for lower ranges of acidity.—The authors found that the electrolytes originally present in gluten are sufficient per gm. of gluten to give a conductivity of approximately 200 to 100 cc. of water. From table VII they make the following conclusion: first, the weight of swollen gluten bears no relation to the true swelling because of variations in quantity of protein dissolved; second, it bears no relation to the H ion concentration, except when quantities of gluten and solution are kept constant; third, the chief factor in determining the weight of swollen gluten is the quantity of protein which has been dissolved away; fourth, the amount of gluten dissolved is greater, the greater the acidity; fifth, true swelling of gluten is greater, the greater the acidity. There seems to be a tendency for the true swelling of gluten to increase as the relative quantity of gluten increases. The viscosity seems to depend on H ion concentration, amount of water and electrolytes present in the swollen mass, and, at times, on the age of the system. —*J. M. Brannon*

1221. Hudson, C. S., and Shigeru Komatsu. **The rotary powers of the amides of several α-hydroxy acids of the sugar group.** Jour. Amer. Chem. Soc. 41: 1141–1147. 1919.—See Bot. Absts. 3, Entry 2144.

1222. Hudson, C. S., and K. P. Monroe. **The amide of α-δ-mannoheptonic acid.** Jour. Amer. Chem. Soc. 41: 1140–1141. 1919.

1223. Jacobsen, C. A. **Alfalfa saponin. Alfalfa investigation VII.** Jour. Amer. Chem. Soc. 41: 640–648. 1919.—Alfalfa saponin has the empirical formula $C_{27}H_{37}NO_{16}$. It hydrolyzes to a sapogenin and glucose. Each molecule of saponin has one pentose radical. In the case of fish the alfalfa saponin acts in an asphyxiating manner; otherwise it is not poisonous, except when injected subcutaneously. Then it causes local irritation and death. Alfalfa saponin is readily soluble in water and warm glycerine. It is slightly soluble in hot 95 per cent alcohol and in glacial acetic acid, very slightly in ethyl acetate, carbon tetrachloride, phenol, nitro-benzine, and methyl alcohol. It is insoluble or nearly so in cold 95 per cent alcohol, ether, chloroform, benzine, and amyl alcohol.—*J. M. Brannon.*

1224. Monroe, K. P. **The preparation of xylose from corn cobs.** Jour. Amer. Chem. Soc. 41: 1002–1004. 1919.—The method here described had for its object the removal of the adhesive gum by a more convenient laboratory method than extraction in an autoclave at 160°C. The gum is removed by digestion with dilute alkali at 100°.—*J. M. Brannon.*

1225. Nelson, E. K. **The constitution of capsaicin, the pungent principle of Capsicum.** Jour. Amer. Chem. Soc. 41: 1115–1122. 1919.

1226. Nelson, J. M., and Frank M. Beegle. **Mutarotation of glucose and fructose.** Jour. Amer. Chem. Soc. 41: 559–575. 1919.

1227. Shibata, Keita, Yuji Shibata, and Itizo Kasiwagi. **Studies on Anthocyanins: Color variation in anthocyanins.** Jour. Amer. Chem. Soc. 41: 208–220. 1919.

1228. Smith, C. R. **The mutarotation of gelatin and its significance in gelation.** Jour. Amer. Chem. Soc. 41: 135–150. 1919.

METABOLISM (ENZYMES, FERMENTATION)

1229. Davis, Lewis, and Harvey M. Merker. **Studies on pepsin. I. Chemical changes in the purification of pepsin.** Jour. Amer. Chem. Soc. 41: 221–228. 1919.—The purification of pepsin seems to consist in the elimination of secondary proteins including α-amino acids. Calcium and sulfur seem to be unaltered as a result of purification, but phosphorus is materially reduced. "Chlorides are seemingly removed." The optical activity appears unchanged. —*J. M. Brannon.*

1230. Higgins, B. B. **Gum formation with special reference to cankers and decays of woody plants.** Georgia Agric. Exp. Sta. Bull. 127: 21–60. *Pl. 1–6, fig. 1–15.* Jan., 1919.—Assuming that gummosis is probably brought about by the action of an *enzyme* whose formation from a *zymogen* might be induced by many forms of excitation, several attempts were made to isolate a pectin-dissolving enzyme from gumming wood, but without success. Gummosis in relation to temperature was studied on various species of *Prunus*, *Prunus mahaleb* L. being mainly used. Employing twigs under various conditions it is shown that gum formation is initiated by slight drying and that bud and callus growth will not start in a saturated atmosphere. With twigs it was experimentally determined that the minimum temperature at which perceptible gum formation occurs is near 10°C., optimum and maximum temperatures not being ascertained. Gumming in relation to chemical poisons was studied by introducing small quantities of $HgCl_2$, $CuSO_4$, and $(NH_4)_2SO_4$ under the bark of various species of *Prunus* and covering the wounds with grafting wax. After seventeen days no killing of the tissues was noted around the $(NH_4)_2SO_4$. The $HgCl_2$ and $CuSO_4$ induced gum formation around the wounds in forty-eight hours. The bark of the branches was killed from 15 to 60 cm. above the wound and to 2.5 cm. below, while the wood was killed to a greater distance with a dark deposit of gum at the lateral limits. Twigs of *Prunus persica* placed in diluted solutions of $HgCl_2$ from 1–500 to 1–1,000,000 showed gumming in dilutions of 1–500,000. Experiments on dormant trees showed that active growth is not essential for gum formation. For studying microtome sections the ruthenium red-methyl green combination stained the

middle lamellae bright red and the secondary lamellae green, the gum showing greater or less attraction for one or the other stain.—In relation to various diseases and injuries gumming was studied in a variety of woody plants. It is concluded that the process is quite general in woody plants and is due to the activities of an enzyme, the zymogen of which is constantly present. Certain stimuli induce the formation of large quantities of the enzyme causing liquefaction of the pectic substances, which are deposited in the tissues or exuded as gum. As a means by which plants are protected from serious injury through surface wounds or fungous attacks gum formation is considered important. A bibliography is appended.—*T. H. McHatton.*

METABOLISM (RESPIRATION)

1231. Irwin, Marian. **Comparative studies on respiration. VI. Increased production of carbon dioxide accompanied by decrease of acidity.** Jour. Gen. Physiol. 1: 399–403. 1919.—The petals of *Salvia involucrata* and *S. splendens* were employed in this study. The author finds that ether increases the consumption of oxygen in the petals of these plants as well as producing an increased production of CO_2. There is also an accompanying decrease in the acidity of the cells.—*J. M. Brannon.*

1232. Northrup, J. H. **The effect of various acids on the digestion of proteins by pepsin.** Jour. Gen. Physiol. 1: 607–612. 1919.—The author found that in equal hydrogen ion concentrations the rate of pepsin digestion of gelatin, egg albumin, blood albumin, casein, and edestin is the same in the solutions of hydrochloric, nitric, sulfuric, oxalic, citric, and phosphoric acids. The rate of digestion of all the protein, with the exception of gelatin, was decreased by acetic acid. There was no evidence of antagonistic salt action. The aggregation of the protein and the viscosity of the solution have no marked influence on the rate of digestion of the protein.—*J. M. Brannon.*

1233. Rockwood, Elbert W. **The effect of neutral salts upon the activity of ptyalin.** Jour. Amer. Chem. Soc. 41: 228-230. 1919.

1234. Sherman, H. C., Florence Walker, and Mary L. Caldwell. **Action of enzymes upon starches of different origin.** Jour. Amer. Chem. Soc. 41: 1123–1129. 1919.—When wheat, maize, and rice starches are purified by washing with very dilute alkali, they show the same digestibility. When they are acted upon by the same kind and amount of amylase, they are all transformed into reducing sugar at essentially the same rate. "This is true whether the digestive agent be saliva, pancreatin, purified pancreatin, amylase, malt extract, purified malt amylase, taka-diastase, or the purified amylase of *Aspergillus oryzae*." Fatty substances hindered the hydrolysis of some of the cereal starches, especially maize.—*J. M. Brannon.*

1235. Sherman, H. C., A. W. Thomas, and M. E. Baldwin. **Influence of hydrogen ion concentration upon enzymic activity of three typical amylases.** Jour. Amer. Chem. Soc. 41: 231–235. 1919.

ORGANISM AS A WHOLE

1236. Brann, F. R. **Factors concerning the drop of immature citrus fruit in central California.** Monthly Bull. Comm. Hortic. California 2: 74–75. 1919.—See Bot. Absts. 3, Entry 1057.

1237. Dawson, Andrew Ignatius. **Bacterial variations induced by changes in the composition of culture media.** Jour. Bact. 4: 133–148. 1919.—Variations in bacteria were induced by changing the environment in which the bacteria live. Cultures of *Bacillus coli* were grown on 8 different types of media for 200 generations and then tested for variation as to the chemical composition, including relative amounts of water and volatile matter, ash, sulphur, phosphorus, calcium, total nitrogen, amino-nitrogen, proteins, fats, and carbohydrates.

Variations were found to occur in the chemical composition of the different cultures and also in the biological characteristics. The latter included the ability to produce enzymes capable of splitting different carbohydrates with the formation of gas and acid, and the ability to agglutinate with immune rabbit serum prepared with the organism as antigen. Variations were so great as to change one generally recognized species, *Bacillus coli-communior*, into another, *Bacillus coli-communis*, by the use of fatty acids in the culture medium. Methods of work are included in the paper.—*Chester A. Darling.*

1238. Howe, C. D. **Making of the spruce tree.** Canadian Forestry Jour. **14**: 186. 1919. —See Bot. Absts. 3, Entry 548.

1239. Itano, Arao, and James Neil. **Influence of temperature and hydrogen ion concentration upon the spore cycle of Bacillus subtilis.** Jour. Gen. Physiol. **1**: 421–428. 1919.—Spores incubated at 5°C. for twenty days showed no apparent change except a slight swelling. This swelling took place in all hydrogen ion concentration tested (P_H 1–13). At 25° the spores germinated in H ion concentration corresponding to the exponential range 5–10. The maximum germination was at P_H 7 and P_H 8.—*J. M. Brannon.*

1240. Lundegardh, Henrik. **Ekologiska och fysiologiska studier på Hallands Väderö. II. Till kannedom om strandväxternas fysiologi och anatomi. [The physiology and anatomy of shore-plants.]** [Swedish, with English summary.] Bot. Notiser **1919**: 1–39. 1919.

1241. Phillips, R. W. **Note on the duration of the prothallia of Lastraes filix-mas. (Presl).** Ann. Bot. **33**: 265–266. 1919.—See Bot. Absts 3, Entry 1113.

GROWTH, DEVELOPMENT, REPRODUCTION

1242. Appleman, Charles O. **Root growth in cuttings.** [Rev. of: Curtis, Otis F. **Stimulation of root growth in cuttings by treatment with chemical compounds.** Cornell Univ. Agric. Exp. Sta. Mem. **14**: 71–138. 1918.] Bot. Gaz. **67**: 100–101. 1919.

1243. Gertz, Otto. **Kallushypetrofier och några i samband dermed serående anatomiskt-fysiologiska förhallånden hos minerade blad. [Callus hypertrophies and some anatomical-physiological conditions connected with them in insect-mined leaves.]** [Swedish, with short German resumé.] Bot. Notiser **1918**: 121–139. *Fig. 1-129.* 1918.—Callus formations, which had developed around borings of insect larvae in the leaves of *Lonicera Xylosteum, L. Periclymenum, Lamium album, Pyrus Malus, Betula verrucosa, Ranunculus repens*, and *Corylus Avellana*, are described and discussed. Reference literature, 29 articles.—*P. A. Rydberg.*

1244. Reed, H. S., and R. H. Holland. **The growth rate of an annual plant, Helianthus.** Proc. National Acad. Sci. [U. S. A.] **5**: 135–144. *Fig. 1–3.* 1919.—The growth of an organism depends on two groups of factors. One of these groups is essentially internal, and may be designated the genetic constitution of the individual; the other is essentially external, and consists of the complex of environmental influences. If the growth rate of an organism corresponds closely to the equation of autocatalysis, this fact would seem to indicate that growth is predominantly controlled by internal factors.—This paper analyzes growth data for fifty-eight sunflower plants from one lot of seed of unknown ancestry, which were grown in the field under favorable and fairly uniform conditions at Riverside, California. Height of stem was measured at seven-day intervals until elongation stopped. The variability in height as measured by the coefficient of variability increased rapidly for about two weeks and fluctuated irregularly thereafter. The rate of growth increased rapidly to a maximum, then rapidly declined as the flower head formed. The successive observed mean increments in height corresponded closely to the theoretical values calculated from the equation of autocatalysis. Temperature variations showed only a low and statistically unreliable correlation with the growth rate, while atmometer readings gave no significant evidence of such a correlation. When the plants are divided into four equal groups on the

basis of height at maturity, the constant K of the formula for autocatalysis is nearly the same for all four groups; evidently, therefore, the differences in height between these quartile groups were not due to differences in the growth constant.—It is concluded that the data indicate that the course of the growth process is dominated by internal factors.—*Howard B. Frost.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1245. SMITH, ERWIN F. **The cause of proliferation in Begonia phyllomaniaca.** Proc. National Acad. Sci. [U. S. A.] 5: 36–37. 1919.—A "synopsis" of a paper to be published in *The Journal of Agricultural Research.* The leaves and stems of this begonia may proliferate as a result of injury to the leaves, stems, or roots. The shoots produced may be very numerous, though only a few establish permanent vascular connections and persist as true branches. Either acicular or glandular hairs, as well as ordinary epidermal cells, may produce buds. Only young cells are affected. The cause of proliferation is considered to be some cell change due to a sudden checking of the water supply.—*Howard B. Frost.*

1246. VAN AMEIJDEN, U. P. **Geotropism and phototropism in the absence of free oxygen.** Recueil Trav. Bot. Néerland. 14: 150–216. *5 pl. 1 fig.*, 1917. [Received, 1919.]—Experiments unlike those previously performed were done under normal atmospheric pressure and only partial pressure of oxygen was reduced. A specially constructed thermostat was used in which oxygen could be replaced by nitrogen by gradual diffusion. *Avena sativa* was taken because it proved particularly suitable as used by other experimenters. *Sinapis alba* (p. 191), because of the absence of cavities under the cotyledon, was the other plant worked with. A carbon filament lamp with photometric value 5 m.c. at one meter was the source of light. Commercial nitrogen from cylinders had its small amount of oxygen (about 3.3 per cent, removed with alkaline pyrogallol. Owing to the fact that the gas so treated formed a small quantity of carbon monoxide this had to be removed by passing the gas over heated copper oxide in a combustion furnace until it had no longer a toxic effect on the plants. The author found that it was necessary to deprive the seedlings of oxygen for a considerable time to inhibit phototropic curvature. This is owing, first, to the fact that, due to intramolecular respiration, the objects have sufficient energy at their disposal to enable them for a long time to perceive stimulus and react, when after stimulation they have been supplied with air; and, secondly, because it is possible that the intercellular cavities as well as the cavity found between the coleoptile and the first leaf, may hold air a long time. The results of the author agree with those of Correns in that oxygen is found necessary for the occurrence of stimulus movements. There is disagreement with Correns, however; in that the author finds the phenomena in geotropic and phototropic stimulation processes to be in all respects much alike. The author claims to overcome the difficulties of other methods by eliminating the variation due to partial vacuum while oxygen was removed from the plants, so that the marked difference in results and conclusions reported are claimed as justification of this criticism. When seedlings which had been long enough removed from the influence of oxygen are stimulated geotropically or phototropically in the absence of oxygen and are then at once placed in atmospheric air, they are unable to execute a reaction. If the seedlings are given a similar fore-period in an oxygen-free atmosphere, and the stimulus is administered in air in which the plants are left subsequently, a reaction does occur. In an oxygen-free environment the perception of a stimulus cannot therefore take place provided that the condition of a sufficiently long fore-period has been satisfied. If after perception of a geotropic or phototropic stimulus the seedlings are left in the oxygen-free-atmosphere, they do not react, so that the presence of oxygen is also necessary for the occurrence of the reaction. In an atmosphere of low oxygen content the seedlings remain for a long time able to perceive normally, but a prolonged stay in such an atmosphere weakens the power of perception. There are no indications that on complete or partial withdrawal of oxygen the reaction of seedlings to a geotropic stimulus differs from their reaction to a phototropic one.—*J. A. Nieuwland.*

1247. Lundegardh, Henrik. **Über Beziehungen zwichen Reizgrösse und Reaktion beider geotropischen Bewegung und über den Autotropismus. [Stimulus magnitude and reaction in geotropic movement, also autotropism.]** Bot. Notiser 1918: 65–118. *Fig. 1–13.* March, 1918.

REGENERATION

1248. Loeb, Jacques. **The physiological basis of morphological polarity in regeneration. II.** Jour. Gen. Physiol. 1: 687–715. 1919.—The mass of the leaf attached to the stem influences the mass of air roots formed. Darkened leaves do not increase the mass of roots formed. When a stem is suspended horizontally, the roots come from the under side, except at the cut end where they appear around the whole circumference of the stem. If the under half of a horizontally suspended stem be removed, then roots appear on the upper half.—*J. M. Brannon.*

TEMPERATURE RELATIONS

1249. Åkerman, Å. **Über die Bedeuting der Art des Auftauens für die Erhaltung gefrorener Pflanzen. [Significance of the manner of thawing in the recovery of frozen plants.]** Bot. Notiser 1919: 49–64; 105–126. 1919.

TOXIC AGENTS

1250. Arnould, A. **Dommages causèes aux vègètaux par les fumes industrielles. [Damages caused to plants by industrial fumes.] [Rev. of: Holmes, J. A., E. C. Franklin, and R. A. Gould. Report of the Selby Smelter Commission, U. S. Dept. Interior, Bur. Mines Bull. 98: 1–528.** *Pl. 1–41, fig. 1–14.* 1915.] Rev. Eaux et Forêts 57: 121–125. 1919—See Bot. Absts. 3, Entries 513 and 1150.

ELECTRICITY AND MECHANICAL AGENTS

1251. Merchan, A. **Informe sobre tratamiento electrico de semillas antes de la siembra. [Electrical treatment of seed.]** Revist. Agric. Com. y Trab. 2: 199–201. 1919.—A review is given of work done in England by H. E. Fry who treated seeds by passing an electric current through a salt solution containing the seeds. Good results were secured with seeds of oats, wheat, barley, and corn. Notes on the apparatus and results are included.—*F. M. Blodgett.*

MISCELLANEOUS

1252. Butterwick, A. J. S. **The use of Atlas preservative to kill trees.** Indian Forester 45: 22–25. 1919.—See Bot. Absts. 3, Entry 521.

1253. Ciamician, G. **Comparazioni e ravvicinamenti. Acqua ed ammoniaca. [Comparisons and similarities. Water and ammonia.]** Gaz. Chim. Italiana 49: 10–16. 1919.—A study of water and ammonia from a stochiometrical standpoint. The similarity in behavior of H_2O, — OH, = 0, to NH_3, — NH_2, and = NH, in the formation of hydrogen peroxid, hydroxylamin, hydrazin. In the formation of C = O, C = NH, and various cyanide derivatives, urea, carbamic acid, guanidine, isoureic ether, as well as dicyandiamide, biuret, and the nitril derivatives of HCN.—*A. Bonazzi.*

1254. Fred, E. B. **The growth of higher plants in soils free of microorganisms.** Jour. Gen. Physiol. 1: 623–629. 1919.—A method for sterilizing seeds is described and also an apparatus for growing plants under sterile conditions.—*J. M. Brannon.*

1255. Gertz, Otto. **Anomalier hos rhizoiderna a grodd-knoppar af Lunaria cruciata L. [Anomalies in the rhizoids on the gemmae of Lunaria cruciata L.]** [Swedish, with German resumé.] Bot. Notiser 1918: 141–150. *Fig. 1–21.* 1918.—See Bot. Absts. 3, Entry 1118.

1256. Henderson, L. J., W. O. Fenn, and Edwin J. Cohn. Influence of electrolytes upon the viscosity of dough. Jour. Gen. Physiol. 1: 387–397. 1919.

1257. Larson, W. P., W. F. Cantwell, and T. B. Hartzell. The influence of the surface tension of the culture medium on the growth of bacteria. Jour. Infect. Diseases 25: 41–46. 1919.—A sodium salt of castor oil was used for depressing the surface tension of ordinary bacteriological broth. All pellicle forming bacteria ceases to grow at the surface where the tension is below 45 dynes, the surface tension of the broth itself being 59 dynes. When *B. subtilis* is grown on broth of low surface tension, the tendency to form spores is considerably reduced. Some anaerobes, notably *B. tetani*, grow well aerobically on a medium of reduced surface tension. It is suggested that the layer of oil used to cover media for the purpose of producing an aerobiosis probably acts by reducing the surface tension rather than by excluding oxygen.—*Selman A. Waksman.*

1258. Lecomte du Nouy, P. A new apparatus for measuring surface tension. Jour. Gen. Physiol. 1: 521–524. 1919.

1259. Lindet. Sur l'utilisation des sarments de vigne, des pépins et des marcs de raisins. [The utilization of grape shoots, seeds, etc.] Compt. Rend. Acad. Agric. France 1919: 156–157. 1919.—See Bot. Absts. 3, Entry 1072.

1260. Moreno, Eduardo. La combustibilidad del tabaco. Contribucion al estudio agroquimico de la plants. [Relation of fertilizers to combustibility of tobacco.] Revist. Agric. Com. y Trab. 2: 169–170. 1919.—See Bot. Absts. 3, Entry 1265.

SOIL SCIENCE

J. J. Skinner, *Editor*

FERTILIZATION

1261. Aston, B. C. Improvement of poor pasture. New Zealand Jour. Agric. 18: 15–27 1919.—See Bot. Absts. 3, Entry 900.

1262. Clark, C. F. The potato industry in Colorado. Potato Mag. 1^{11}: 8–9, 22; 1^{12}: 14–15, 29. *8 fig.* 1919.—See Bot. Absts. 3, Entry 920.

1263. Clinton, G. P. Prematuring and wilting of potatoes. Potato Mag. 1^{12}: 12–13, 24. 1919.—See Bot. Absts. 3, Entry 1162.

1264. McHatton, T. H., J. W. Firor, and R. E. Blackburn. Growing tomatoes in Georgia. Georgia State Coll. Agric. Bull. (Reprint) 145: 1–12. *Fig. 1.* 1919.—See Bot. Absts. 3, Entry 1075.

1265. Moreno, Eduardo. La combustibilidad del tabaco. Contribution al estudio agro-quimico de la planta. [Relation of fertilizers to combustibility of tobacco.] Revist. Agric. Com. y Trab. 2: 169–170. 1919.—General discussion with results to follow in other articles.—*F. M. Blodgett.*

1266. Wheeler, H. J. Fertilizers stimulate production in Maine. Potato Mag. 1^{12}: 30. *1 fig.* 1919.

1267. Wheeler, H. J. What potatoes need in Wisconsin. Potato Mag. 1^{11}: 14, 31. *1 fig.* 1919.—Advocates use of complete commercial fertilizer.—*Donald Folsom.*

1268. White, J. W. Fertilizer experiments on DeKalb soil. Yields of clover, corn and Kentucky blue grass. Pennsylvania Agric. Exp. Sta. Bull. 155: 3–20. *4 pl., 17 fig.* 1919.—The experiments were conducted upon 33 plots of one-tenth acre each. They are intended to

test the comparative value in different forms and amounts of commercial fertilizers upon corn, oats, wheat, clover and pasture grasses on DeKalb soil for the purpose of ascertaining the most economical means of reclaiming the abandoned farmland in the DeKalb area and of increasing and maintaining the productivity of DeKalb soils now under cultivation.—*C. R. Orton.*

FERTILIZER RESOURCES

1269. Ebaugh, W. C. **America's advance in potash production.** Bull. Sci. Lab. Denison Univ. **19**: 33–47. 1919.—The total production of fertilizer potash in the United States has increased from practically nothing in 1914 to 52,000 tons in 1918, thus reaching 22 per cent of the pre-war consumption.—Natural brine lakes have furnished 75 per cent of this increase, kelp reduction plants 8 per cent, molasses and distillery wastes 6 per cent, alunite deposits of Utah 5 per cent, cement mill dust 2 per cent.—The total capacity of these potash plants for 1919 is 100,000 tons or 40 per cent of normal consumption.—Only the kelp reduction plants closed down with the signing of the armistice.—*Harris M. Benedict.*

1270. Hutchinson, C. M. **Nitrogenous fertilizers, their use in India.** Agric. Jour. India **14**: 203–214. 1919. India is in danger of depletion of the soil unless nitrogenous manures can be imported at a lower price, or better use can be made of indigenous supplies of nitrogen. A popular and practical discussion of the nitrogen question as related to India. —*F. M. Schertz.*

BIOLOGY

1271. Bristol, B. Muriel. **On the retention of vitality by algae from old stored soils.** New Phytol. **18**: 92–107. *Fig. 1–2.* 1919.—See Bot. Absts. 3, Entry 694.

1272. Hutchinson, C. M. **Nitrogen fixation in Indian soils.** Agric. Jour. India **14**: 215–219. 1919.—The need of study on nitrogen fixation problems for India is urged.—*F. M. Schertz.*

1273. Pearson, G. A. [Rev. of: Hesselman, Henrik. **Soil nitrofication in relation to forest reproduction.** Skogsvordsforeningens Tidskr., **1**: 1–104. 1918.] Jour. Forestry **17**: 69–73. 1919.—See Bot. Absts. 3, Entry 564.

1274. Temple, J. C. **The value of ammonification tests.** Georgia Agric. Sta. Bull. 126· *18 p.* Jan., 1919.—Results obtained by studying the ammonifying efficiency, ammonifying inoculating power and ammonifying capacity of a series of soils showed an unexplainable disagreement. Further studies on another series of soils, ranging from a heavy clay subsoil to rich, friable clay and dark alluvial soil showed that the ammonifying efficiency of a soil is determined more by the physical or chemical character than by the biological. Experiments in modifying the soils chemically showed that the addition of phosphate in any form caused a large increase in the amount of the ammonia recovered; the largest amount being from the sample with the Mono-basic salt; thus showing that the increase was not due to the neutralization of acid; these results indicate that an abundant phosphorus supply might be an important factor in ammonia production in soils. When opening the bottles of the samples under test a distinct smell of ammonia was obtained; moistened red litmus paper was quickly changed to blue in the bottles. To test the possible loss of ammonia in this way samples were run in large bottles and in each was suspended a fluted filter paper moistened with H_2SO_4. The amounts of ammonia recovered from the filter paper were, in two instances, *.4* per cent of the total recovered from the sample. In some experiments cotton seed meal, casein and albumen were used as sources of nitrogen; the greater loss from the soil was found where casein was used, the smaller loss from cotton-seed meal. Dissolved and powdered casein and dried blood were used as sources of nitrogen. These results as well as other data at the station show the small value of ammonification tests as an aid to solution of bacterial problems. A bibliography is appended.—*T. H. McHatton.*

1275. Waksman, Selma A. The occurrence of Azotobacter in cranberry soils. Science **48**: 653–654. 1918.—See Bot. Absts. 2, Entry 1145.

METHODS

1276. Lynde, C. J. On an electrical method of determining the lime requirement of soils. Trans. Soc. Canada Sect. III. 12: 21. 1918.—The method is based on the following theory as stated by the author: "If a soil lacks a certain fertilizer, for example K, P. Ca or N, it is probable that it will absorb this fertilizer from solution, and the greater the lack the greater the absorption." As a test of this theory a comparison was made of the lime requirements of 12 soils determined by the Rothamstead method, with those found by the proposed electrical method. The author concludes from the results reported that it may be possible to work out an electrical method for the determination of lime requirements of soils.—*R. B. Deemer.*

SOIL CLASSIFICATION

1277. Wilsdon, B. H. The need and objects of a soil survey in the Punjab. Agric. Jour. India 14: 281–291. 1919.—Soil survey is urged in connection with settlement, and irrigation problems. Mechanical analysis of soils is their main basis of classification. The results are plotted graphically on a triangular diagram and show the percentages of silt, sand and clay. The soils are further differentiated by plotting the logarithms of the ratio $\frac{\text{fine silt}}{\text{silt}}$ fine silt and $\frac{\text{fine sand}}{\text{coarse sand}}$ coarse-sand. The constitutive, additive, colligative, variable and agricultural properties of the soil are to be studied.—*F. M. Schertz.*

MISCELLANEOUS

1278. Faulkner, O. T. "Water saving" experiments. Agric. Jour. India 14: 245–55. 1919.—Factors affecting water-cost are noted. Some of the problems discussed are: the relation between frequency of irrigation and the stage of growth of the crop; the best depth of water to apply at one time under varying conditions of soil, season and crop; relation between total irrigation and yield; richness of soil and water-cost of crops grown upon it; tilth of soil and water-cost of crops grown upon it.—*F. M. Schertz.*

1279. Miller, Justus. Northern Ontario seed potato trade. Potato Mag. 1[11] 5, 33–34. 1919.—See Bot. Absts. 3, Entry 881.

1280. Shutt, Frank T., and E. A. Smith. The 'alkali' content of soils as related to crop growth. Trans. Roy. Soc. Canada (Sec. III.) 12: 83. 1918.—The nature and distribution of "alkali" as occurring in soils of certain semiarid districts of Western Canada were studied, and the results presented in this paper are a contribution towards the establishment of standards as regards safe limits of alkali, particularly as applied to Canadian conditions. Analysis of five soil groups, each series consisting of three groups representative of land upon which (1) there was fair growth, the concentration of the alkali, if present, being apparently negligible, (2) there was poor growth, the crop evidently being distressed by the alkali, and (3) there was no growth due to excess of alkali, are reported. Five samples for each group were selected. The limits of toxicity of the various "alkalis" were determined for Western Rye grass upon a dark brown, almost black, moderately light loam, of good quality; subsoil of heavier character, a dark grey to yellow grey clay with a little sand: for native Prairie grass upon a fairly good sandy loam; subsoil of a heavier nature with a considerable portion of clay: for Oats upon a sandy loam of good quality; for Wheat upon a brown loam of fairly good quality subsoil a heavy clay: for Onions upon a dark brown sandy loam, well supplied with organic matter; sandy subsoil with silty clay.—*R. B. Deemer.*

ATXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

PTERIDOPHYTES

1281. Bonaparte, R. **Notes Pteridologiques.. [Pteridological Notes.] 7: 1–418.** Published by the author: Paris, Oct. 14, 1918.—The present fascicle is concerned with ferns represented in the herbarium of Prince Bonaparte. Several lists of ferns from different parts of the world are presented and the species enumerated are accompanied by important data. The following new species and varieties are included: *Pteris decurrenti-pinnulata* from Formosa, *Trichomanes javanicum* Blume var. *glabra*, *Dryopteris crenulata*, *D. parasitica* O. Kuntze var. *aureoglandulosum*, *Leptochilus pentagonalis*, *Adiantum caudatum* L. var. *angustilobata*, *A. caudatum* L. var. *latilbobata*, *Pteris quadriaurita* Retz. var. *infurcata*, and *Cyclophorus rhomboidalis* from China, *Polystichum pauciaculeatum and Blechnum Bakeri* Christensen var. *glabra* from Madagascar, *Leptochilus acrostichoides* Christensen var. *cuneata* western Africa, *Dryopteris adenochlamys* Christensen var. *minor* from French Soudan, *Davallia denticulata* Mett. var. *Vogelii* forma *camerounensis* from Cameroun, *Hymenophyllum Kuhnii* Christensen var. *stenoloba* from Nyassaland, *Asplenium praemorsum* Sw. var. *angustitripinnatum* from Orange Free State, *Elaphoglossum perelegans* Moore var. *integrisquamulata* from Guadeloupe, *Dryopteris setigera* O. Kuntze var. *squamiciliata* from Tahiti, *Nephrolepis dayakorum* and *Pteris dayakorum* from Borneo, *Oleandra Whitmeei* Baker var. *minor* and *Elaphoglossum marquisearum* from the Marquesas Islands.—*J. M. Greenman.*

1282. Dodge, Charles Keene. **Contributions to the botany of Michigan, II. Observations on the flowering plants, ferns and fern allies growing wild in Marquette County, Michigan, in 1916 and 1917, especially in the vicinity of the Huron Mountain Club.** Univ. Michigan Mus. Zoology, Misc. Pub. No. 5. *44 p., 1 map.* July 13, 1918.—See Bot. Absts. 3, Entry 1289.

1283. Hayata, Bunzo. **Notes on Archangiopteris and Protomarattia.** [Article in Japanese.] Bot. Mag. Tôkyô, 32: 237–244. 1918.—Study on phylogeny of *Archangiopteris* and a new genus *Protomarattia* is briefly stated. The author records 4 species of *Archangiopteris*, among them *A. subintegra* and *A. tamdaoensis* are stated as new to science, both of them are found in Tonking, China. His new genus *Protomarattia* is very close to *Archangiopteris* in its vegetative organs, while in the propagative organs the genus is rather near to *Marattia*. Lastly the author emphasizes an importance of the stelar system for the systematic study of *Marattiaceae.—T. Matsumoto.*

1284. Matsuda, Sadahisa. **A list of plants collected in Szechuen by I. Yamadzuta.** Bot. Mag. Tôkyô. 32: 165–174. 1918.—See Bot. Absts. 3, Entry 1309.

1285. Rosendahl, H. V. **Tre för Norra Europa nya Asplenier. [Three Asplenia new to northern Europe.]** Bot. Notiser 1918: 161–168. 1918. These are: *Asplenium adulterinum* Milde and *A. adulterinum* × *viride* Aschers. from the mountain Taberg, province of Småland, Sweden, and *A. Adiantum-nigrum* subsp. *cuneifolium* Viv. from the vicinity of Bruvik on Österö, Södre Bergenshus amt, Norway. Two new forms of the first are also described: forma *decumbens* and forma *microphyllum.—P. A. Rydberg.*

SPERMATOPHYTES

1286. Beauverd, G. **Excursions phytogéographiques aux environs de Viège et de Zermatt (Valais). [Phytogeographic excursions in the vicinity of the Viège and in Zermat (Valais).]** Bull. Soc. Bot. Genéve II, 10: 258–316. *Fig. 4.* 1918.—In connection with a discussion of the general character of the vegetation of the region under consideration several new varieties, forms, and hybrids of flowering plants are characterized, and a few new combinations are made.—*J. M. Greenman.*

1287. Bews, J. W. The grasses and grasslands of South Africa. 8vo. *vi + 161 p., 24 fig., 1 map.* P. Davis & Sons, Ltd.: Pietermaritzburg, 1918.—The subject is treated under four captions; namely, (I) Introduction, (II) Key to the genera and species of South African grasses, (III) General sketch of the grasslands of South Africa and their development. The key covers approximately 500 species. A list of scientific names of the grasses and their English, Dutch, Zulu, and Sesuto names is given in an Appendix. [See Bot. Absts. 2, Entry 7.]—*J. M. Greenman.*

1288. Cardot, J. Notes sur des Rosacées d'Extrême-Orient. [Notes on the Rosaceae of the extreme Orient.] Bull. Mus. Hist. Nat. Paris 24: 63–87. 1918.—This article concerns the Rosaceae of China and Japan and includes new combinations with name-bearing synonyms in parentheses and new names, as follows: *Cydonia Delavayi* (*Pirus Delavayi* Franch.), *C. japonica* Pers. var. *cathayensis* (*C. cathayensis* Hemsl.), *Pirus Matsumurae* (*Malus Matsumurae* Koidz.), *P. micromalus* (*Malus micromalus* Mak.), *P. theifera* (*Malus theifera* Rehd.), *P. Sieboldii* Regel. var. *integrifolia* (*P. Toringo* var. *integrifolia* Fr. & Sav.), *P. Sieboldii* Regel. var. *incisa* (*P. Toringo* var. *incisa* Fr. & Sav.), *P. Henryi* (*Sorbus Henryi* Rehd.), *P. Zahlbruckneri* (*Sorbus Zahlbruckneri* Schneid.), *P. commutata*, *P. Hemsleyi* (*Micromeles Hemsleyi* Schneid.), *P. xanthoneura* (*Sorbus xanthoneura* Rehd.), *P. pekinensis* (*Sorbus pekinensis* Koehne), *P. amurensis* (*Sorbus amurensis* Koehne), *P. Wilsoniana* (*Sorbus Wilsoniana* Schneid.), *P. pluripinnata* (*Sorbus foliolosa* var. *pluripinnata* Schneid.), *P. Rehderiana* (*Sorbus Rehderiana* Koehne), *P. mesogea*, *P. mesogea* var. *syncarpa* (*Sorbus hupehensis* var. *syncarpa* Koehne), *P. reuncupata*, *P. Koehneana* (*Sorbus Koehneana* Schneid.), *P. cashmiriana* (*Sorbus cashmiriana* Hedl.), *P. setschwanensis* (*Sorbus Vilmorini* var. *setschwanensis* Schneid.), *P. sambucifolia* Cham. & Schl. var. *pseudogracilis* (*Sorbus sambucifolia* var. *pseudogracilis* Schneid.), *P. commixta* (*Sorbus commixta* Hedl.), *P. rufoferruginea* (*Sorbus rufoferruginea* Koidz.), and *P. sibirica* (*Sorbus sibirica* Hedl.), Several new forms are also characterized.—*J. M. Greenman.*

1289. Dodge, Charles Keene. Contributions to the botany of Michigan, II. Observations on the flowering plants, ferns and fern allies growing wild in Marquette County, Michigan, in 1916 and 1917, especially in the vicinity of the Huron Mountain Club. Univ. Michigan Mus. Zoology, Misc. Pub. No. 5. *44 p., 1 map.* July 13, 1918.—The title amply indicates the scope and character of this contribution. The manuscript was completed by the author shortly before his death, but the paper was edited for publication by Messrs. C. Billington and B. Gladewitz. The list of species is a very full one for a limited area, and the habitat and distributional notes are of especial interest.—*J. M. Greenman.*

1290. Gagnepain, F. Cucurbitacées nouvelles de l' Herbier du Muséum. [New Cucurbitaceae in the Herbarium of the Museum.] Bull. Mus. Hist. Nat. Paris 24: 371–380. 1918.—The following new species are described from China: *Alsomitra Balansae*, *A. tonkinensis*, *Gomphogyne Bonii*, *G. Delavayi*, *Gymnopetalum monoicum*, *G. Penicaudii*, *Momordica Eberhardtii*, *M. laotica*, *M. tonkinensis*, *Schizopepon Fargesii*, *S. longipes*, *S. Wilsonii*, *Trichosanthes baviensis* and *T. Pierrei.*—*J. M. Greenman.*

1291. Gagnepain, F. Revision des Thladiantha asiatiques du Muséum. [Revision of the Asiatic Thladiantha of the Museum.] Bull. Mus. Hist. Nat. Paris 24: 287–296. 1918.—The author presents a synoptical revision of the Cucurbitaceous genus *Thladiantha*, which is distributed chiefly in eastern Asia, and recognizes 19 species of which the following are described here for the first time: *Thladiantha montana*, *T. yunnanensis*, *T. Oliveri* Cogn., *T. glabra* Cogn., *T. Legendrei*, *T. heptadactyla* Cogn., *T. maculata* Cogn., *T. villosula* Cogn., *T. verrucosa* Cogn., and *T. tonkinensis.*—*J. M. Greenman.*

1292. Gerbault, Ed. Recherches sur la Constitution du Phénotype Linnéen Ranunculus repens dans la province du Maine et la Basse-Normandie. [Researches on the constitution of the Linnean phenotype Ranunculus repens occurring in Maine and Lower Normandy.] Bull. Soc. Agric. Sci. and Arts Sarthe II, 38: 305–343. *Pl. 3, text fig. 7.* 1918.—The author presents

a brief discussion of the species concept with particular reference to *Ranunculus repens* L. and characterizes the following subspecies: *R. repens* subsp. *Bernardii*. *R. repens* subsp. *latifolius*, *R. repens* subsp. *Desportesianus*, *R. repens* subsp. *angustifolius*, *R. repens* subsp. *scriptus*, and *R. repens* subsp. *reptabundus*.—*J. M. Greenman.*

1293. Grande, L. **Note di floristica.** Bull. Ort. Bot. Napoli 5: 55–67. 1918.—Important notes are recorded concerning several species of flowering plants and the following new combinations are included: *Lens ervoides* (*Cicer ervoides* Brignoli), *Crepis aurea* (L.) Cass. subsp. *lucida* (*Apargia lucida* Ten.), *Ruppia cirrhosa* (*Buccaferrea cirrhosa* Petagna), and *Althaea biennis* (*Alcea biennis* Winterl).—*J. M. Greenman.*

1294. Grande, L. **Rettificazioni ed aggiunte all' Index Kewensis. [Corrections and additions to the Index Kewensis.]** Bull. Ort. Bot. Napoli 5: 179–259. 1918.

1295. Guadagno, M. **La vegetazione della Peninsola Sorrentina. [The vegetation of the Sorrento Peninsula.]** Bull. Ort. Bot. Napoli 5: 133–178. 1918.—The subject is considered under three captions: (1) A bibliography of the principal works concerning the Sorrento Peninsula, (2) Physical description of the district, (3) Botanical explorations of the Sorrento Peninsula. The last part is primarily a brief historical sketch of the botanical explorations and publications relating to the region under consideration from 1572 to the present time.—*J. M. Greenman.*

1296. Hyata, Bunzo. **On a new species of Salvia and a new variety of Chelonopsis.** [Article in Japanese.] Bot. Mag. Tôkyô 32: 252. 1918.—A brief description of a new species *Salvia omerocalyx* and *Chelonopsis moschata* Miq. var. *lasiocalyx* is given. For detailed description see "Daiwan Shokubutsu Zusetsu, Vol. 8."—*T. Matsumoto.*

1297. Hoehne, F. C. **Catalogo e revisño das Leguminosas do Hervario do Museo Paulista com a descripçao de algumas especies e variedades novas encontradas no mesmo. [Catalog and revision of Leguminosae of the Herbarium of the Museo Paulista, with descriptions of several new forms.]** Rev. Mus. Paulista, São Paulo 10: 647–704. *9 pl.* 1918.—The following new species and varieties are described: *Acacia subpaniculata*, *Piptadenia Loefgreniana*, *Calliandra Novaesii*, *Desmanthus tatuhyensis*, *Mimosa desmanthoides*, *M. insidiosoides*, *M. delicatula*, *M. eriophylloides*, *M. eriophylloides* var. *lanosa*, *Sassia Loefgreniana*, and *C. ignorata*.—*J. M. Greenman.*

1298. Hoehne, F. C. **Orchidaceas novas e menos conhecidas dos arredores de S. Paulo. [New or little known orchids from the environs of Sao Paulo.]** Rev. Mus. Paulista, São Paulo 10: 437–446. *3 pl.* 1918.—*Restrepia crassifolia* Edwall is redescribed, and two new species of *Spiranthes* are proposed namely, *S. oligantha* and *S. butantanensis*.—*J. M. Greenman.*

1299. Iwaki, Takanori. **Microscopical distinctions of some Japanese coniferous woods.** [Article in Japanese.] Bot. Mag. Tôkyô. 32: 187–198, 219–237. 1918.—The author gives the detailed description of the microscopical distinctions manifested by the wood tissue of some Japanese conifers: *Sciadopitys verticillata* S. & Z., *Thujopsis dolabrata* S. & Z., *Thuja* japonica, Maxim., *Thuja* (*Biota*) *orientalis* Endl., *Cupressus sempervirens* L., *Chamaecyparis obtusa* S. & Z., and *Chamaecyparis pisifera* S. & Z. Remarkable characteristics of each genus and family are also stated. No marked difference is noted between the different plants of the same species obtained from different geographical origin.—*T. Matsumoto.*

1300. Juel, H. O. **Plantae Thunbergianae. Ein verzeichnis der von C. P. Thunberg in Südafrika, Indien und Japan gesammelten und der in seinen schriften beschriebenen oder erwähnten pflanzen, sowei von den exemplaren derselben, die im Herbarium Thunbergianum in Upsala aufbewahrt sind. [Plants of Thunberg. A catalogue of the plants collected by C. P. Thunberg in South Africa, India, and Japan, and described or mentioned in his writings, as well as specimens of the same which are preserved in the Herbarium in Upsala.]** *Roy Svo.*,

462 p., 1 portrait, 1 map, and 1 text fig. A. B. Akademiska Bokhandeln, Upsala, and Otto Harrassowitz, Leipzig. 1918.—The ample title of this work indicates the general character of the contents. A rather brief biography of Thunberg and a complete list of his publications precede the enumeration of his plants. The genera and species of Thunberg's various publications are listed in full and arranged alphabetically under their respective families; and a relatively large percentage of them are still valid. Of the 74 generic names proposed by Thunberg about 40 are universally recognized in the literature of the present time.—*J. M. Greenman.*

1301. Koidzumi, Geniti. **Contributiones ad floram Asiae orientalis. [Contributions to the flora of eastern Asia.]** Bot. Mag. Tôkyô. 32: 249–259. 1918.—The present article is a continuation from p. 138 of this publication, and the following species are described as new to science: *Ochrosia hexandra, Rapanea Maximowiczii, Evonymus boninensis, Quercus yayeyamensis, Ficus Nishimurae, Thea tegmentosa, T. Miyagii, T. virgata, Eurya boninensis. Elaeocarpus pachycarpa, Rubus Nishimuranus, Scutellaria longituba, Machilus pseudokobu, M. boninensis, Neolitsea boninensis, N. gilva, N. glauca, N. aciculata, N. stenophylla, Eugenia oxygona,* and *Rhamnus senanensis.*—*T. Matsumoto.*

1302. Lecomte, Henri. **Le "Capucin" des Seychelles. [The "Capucin" of the Seychelles.]** Bull. Mus. Hist. Nat. Paris 24: 284–286. 1918.—Among the trees of the Seychelles Islands, there are two which are known by the vernacular name of "Capucin." These are *Northea seychelleana* Hook. f. and *N. brevitubulata* H. Lec. The latter is a species new to science.—*J. M. Greenman.*

1303. Lecomte, Henri. **Les Sapotacées du genre Baillonella. [The Sapotaceae and the genus Baillonella.]** Bull. Mus. Hist. Nat. Paris 24: 142–148. 1918.—A short discussion of the genus *Baillonella* of Pierre is presented, and a new species, *B. obovata,* is added from Congo.—*J. M. Greenman.*

1304. Lecomte, Henri. **Observations sur les Delpydora. [Observations on Delpydora.]** Bull. Mus. Hist. Nat. Paris 24: 455–458. *Fig. 2.* 1918.—From critical studies made, the author gives an emended description of the genus *Delpydora* Pierre and maintains two African species *D. macrophylla* Pierre and *D. gracilis* Chevalier.—*J. M. Greenman.*

1305. Lecomte, Henri. **Une nouvelle plante à fleurs épiphylles. [A new plant with epiphyllous flowers.]** Bull. Hist. Nat. Paris. 24: 55–62. *Fig. 4.* 1918.—The author gives a brief review of the genus *Phylloclinium* and describes one new species, *Phylloclinium bracteatum,* and a new variety *P. bracteatum* var. *coriaceum,* from Congo.—*J. M. Greenman.*

1306. Lüderwalt, G. **O Herbario e o Horto Botanico do Museo Paulista. [The Herbarium and the Botanical Garden of the Paulista Museum.]** Rev. Mus. Paulista, São Paulo 10: 285–311. *1 Pl.* 1918.

1307. MacCaughey, Vaughan. **The endemic palms of Hawaii: Pritchardia.** Plant World 21: 317–328. 1918.

1308. Maiden, J. H.. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 7. *P. 179–200, pl. 152–155.* (Part xxxvii of the complete work.) William Applegate Gullick: Sydney, 1919.—The present part contains descriptions, synonomy, notes, and illustrations of the following species: *Eucalyptus clavigera* A. Cunn., *E. grandifolia* R. Br., *E. aspera* and *E. papuana* F. v. M.—See Bot. Absts. 3, Entry 2995.—*J. M. Greenman.*

1309. Matsuda, Sadahisa. **A list of plants collected in Szechuen by I. Yamadzuta.** Bot. Mag. Tôkyô 32: 165–174. 1918.—The present list consists of 56 species, representing 32 families, which were collected by I. Yamadzuta in Szechuen several years ago. Among them *Sida szechuensis, Spiraca japonica* L. f. var. *Yamazutae, Lysimachia paridiformis* Franch. var. *intermedia, Daphne ambigua, Setaria mauritiana* Spreng. f. *pilosa,* and *Polypodium ensatum* Thunb. f. *lobatum* are described as new to science.—*T. Matsumoto.*

1310. Matsuda, Sadahisa. **Supplement to the list of plants from Hainan.** [Article in Japanese.] Bot. Mag. Tôkyô. 32: 266. 1918.—Twenty-seven species are added to the "List of plants from Hainan," which was published in this magazine. Vol. 31, No. 368.—*T. Matsumoto.*

1311. Minod, Marcel. **Contribution à l' étude du genre Stemodia et du groupe des Stemodiées en Amérique. [Contribution to the study of the genus Stemodia and some groups of the Stemodieae in America.]** Bull. Soc. Bot. Geneva II, 10: 155–252. *Fig. 1–41.* 1918.—Thirty-two species of *Stemodia* are recognized as occurring in America, seven of which are described as new, namely: *S. tenuifolia, S. neglecta, S. humilis, S. Chodati, S. villosa, S. scopariodes* Hassler & Minod, *S. orbiculata,* and *S. pilcomayensis.* All of these new species occur in South America or Mexico, as do the following newly described subspecies and forms: *S. jorullensis* HBK. subsp. *reptans, S. palustris* St.-Hil. forma *salicifolia, S. stricta* Cham. & Schlecht. vars. *paucidentata* and *multidentata.* A number of new combinations are made and four new monotyic genera in the *Stemodieae* are proposed. The new genera are: *Chodophyton,* based on *Stemodiacra ericifolia* Kuntze; *Lendneria,* based on *Capraria humilis* Solander; *Verena,* based on *Stemodia Hassleriana* Chodat, and *Valeria,* based on *Columnea trifoliata* Link.—*Adele Lewis Grant.*

1312. Miyazawa, Bungo. **On the origin of "Kirisima-tsutsuji" (Rhododendron obtusum Planch).** Bot. Mag. Tôkyô 32: 318–331. 1918.—"*Kirishima*" which has been known as *Rhododendron obtusum* Planch. should be called *Rhododendron Kaempferi* Planch. var. *obtusum.* "Kirishima-tsutsuji" and "Kurume-tsutsuji" (*Rh. obtusum* Planch. var. *Sakamotoi* Komatsu) are considered to be closely related in their ancestral forms.—*T. Matsumoto.*

1313. Murbeck, Sv. **Über die organisation und verwandtschaftlichen Beziehungen der gattung Lepuropetalon. [On the organization and natural relationship of the genus Lepuropetalon.]** Arkiv för Botanik 15: No. 10, *12 p.* 1918.—The author has made a detailed study of the structure of the flower, fruit, and seeds of *Lepuropetalon* and concludes that its relationship is with *Parnassia* rather than with *Chrysosplenium* to which genus it has been hitherto allied by most authors.—*J. M. Greenman.*

1314. Nakai, Takenoshin. **A new attempt to the classification of genus Arabis growing in Japan, Corea, Saghaline and the Kuriles.** Bot. Mag. Tôkyô 32: 233–248. 1918.—A new classification of Japanese *Arabis* is stated in the key. Bibliography, synonomy and distribution of species are also given. *A. Stelleri* var. *macrocarpa, A. Boissieuana, A. Boissieuana* var. *nikoensis, A. Boissieuana* var. *shikokiana, A. takesimana, A. Fauriei* Boiss. var. *grandiflora,* and *A. Kishidai* are new to science. The author enumerates *Stenophragma Thalianum,* because it has often been classed under *Arabis.* As stated in the key, *Stenophragma* has incumbent cotyledons and the seeds are more roundish than those of *Arabis.*—*T. Matsumoto.*

1315. Nakai, Takenosin. **Notulae ad Plantas Japoniae et Koreae XVIII. [Notes on Plants of Japan and Korea xviii.]** Bot. Mag. Tôkyô 32: 215–232. 1918.—The plants (341–373) found in Japan and Korea are listed. Among them *Salix splendida, Boehmeria boninensis, Phytolacca insularis, Rosa xanthinoides, Viola seoulensis, Angelica takeshimana, Gardneria insularis, Arisaema capitellatum, Distylium lepidotum, Schima boninensis, Schima liukiuensis, Elaeagnus Nikaii, Veronica Miqueliana, Symplocos Tanakana, Symplocos argutidens, Veronica holophylla, Diervilla subsessilis* and *Saxifraga octopetala* are new to science.—*T. Matsumoto.*

1316. Ottolander, T. **Rafflesia-natuurmonumenten in Sumatra.** Natuurmonumenten van Nederlandisch Indie. Mededeeling 2. *21 p., 3 pl.* May, 1918.

1317. Pellegrin, François. **Quelques remarques sur les Dioscoréacées du Paraguay. [Some remarks on the Dioscoreaceae of Paraguay.]** Bull. Soc. Bot. Genéve II, 10: 383–388. 1918.—The author presents notes on several species of the Dioscoreaceae of Paraguay and

includes the following new combination and new variety: *Dioscorea multiflora* Mart. var. *concepcionis* (*Dioscorea concepcionis* Chod. & Hassl.), and *D. guaranitica* Chod. & Hassl. var. *Balansae*.—*J. M. Greenman.*

1318. Sampaio, A. J. de. **Ipomaea Glaziovii. U. Damm.** Rev. Mus. Paulista, São Paulo 10: 231–244. *7 Pl.* 1918.—The author presents a detailed account of *Ipomaea Glaziovii* U. Damm. and contrasts this species with *I. sinuata* Ort. to which it appears to be most closely related.—*J. M. Greenman.*

1319. Silveira, Alvaro da. **O Mandapuçá (Ciposia Mandapuca Alv. Silv.) Novo genero das Myrtaceas.** Rev. Mus. Paulista, São Paulo 10: 153–159. *1 pl.* 1918.—*Ciposia Mandapuca* is described and illustrated as a new genus and species of the Myrtaceae from Brazil.—*J. M. Greenman.*

1320. Sudre, H. **Conspectus systematicus Hieraciorum Europae. [Systematic conspectus of Hieracium of Europe.]** Bull. Soc. Etud. Sci. Angers. 47: 1–56. 1918.—The present conspectus is an outline of the author's treatment of *Hieracium* giving the subgenera, sections, species, and varieties with synonyms, but without bibliography and descriptions.—*J. M. Greenman.*

1321. Takeda, Hisayoshi. **Notes on far eastern plants. I–VI.** Bot. Mag. Tôkyô 32: 194–203. *Fig. 1–47.* 1918.—New facts, records and remarks on a few far eastern plants are briefly stated. The plant which has long been known as *Gaultheria pyroloides* is not conspecific with the Indian *G. pyroloides*, and should be called *G. Miqueliana* sp. nov. The writer says that *Parnassia alpicola* and *P. simplex* are not distinct species, and proposes to arrange them as *Parnassia alpicola* Mak. var. *evoluta* Tak. and *P. alpicola* var. *simplex* Hay. & Tak. The chief points of difference of the three forms of *Cnidium ajanense* Drude are briefly stated. Distribution of *Vitis Coignetiae* var. *glabrescens* Nak. and occurrence of *Parnassia palustris* var. *alpina* Drude in Japan is reported.—*T. Matsumoto.*

1322. Valeton, Th. **New notes on the Zingiberaceae of Java and Malaya.** Bull. Jard. Bot. Buitenzorg II, 27: 1–166. *Pl. 1–30.* 1918.—The present paper embodies the author's results of further extended studies on the Zingiberaceae of the Malayan Archipelago. The genera treated are *Curcuma, Gastrochilus, Kaemferia*, and *Zingiber*. A rather large number of new species is described and a few new combinations are made; a list of these follows: *Curcuma colorata, C. euchroma, C. ochrorhiza, C. soloensis, C. brog, C. Mangga* Val. & v. Zijp, *C. Heyneana* Val. & v. Zijp, *C. phaeocaulis, C. Lörzingii, C. longispica, C. sylvatica, Gastrochilus Lorzingii, G. apiculatum, G. striatum, G. latilabrum, G. laxiflorum, G. gracile, G. Kunstleri* (*Curcuma Kunstleri* Bak.), *Kaempferia rotunda* L. var. *concolor, Hapochlorema decus-sylvae* (*Kampferia decus-sylvae* Hall), *Zingiber aromaticum, Z. littorale* (*Z. Zerumbet* Sm. var. *littoralis* Val.), *Z. papuanum, Z. Ottensii, Z. acuminatum* var. *borneensis, Z. acuminatum* var. *acutibracteata, Z. Lorzingii, Z. macroglossum*, and *Z. pachystachys*.—*J. M. Greenman.*

1323. Zimmermann, Walther. **Mitteilungen zur Orchiaceras-Gruppe aus Baden. [Contribution to the Orchis-Aceras group from Baden.]** Mitt. Bad. Land. Naturkunde und Naturschutz, Freiburg. N. S. 1: 21–31. *1 pl., 1 text fig.* July 20, 1919.—This article is concerned with a discussion of hybrids between *Orchis* and *Achras*.—*J. M. Greenman.*

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AGRONOMY

C. V. PIPER, *Editor*

1324. ANONYMOUS. El arroz. [Rice.] Informacion Agric. [Madrid] 9: 200–201. 1919. —Compilation of statistics of rice production for the world, chemical composition, value as a food, and rice-induced diseases.—*John A. Stevenson.*

1325. ANONYMOUS. Materias grasas de los desperidicios del descascarillado del arroz. [Fats from rice hulls.] Informacion Agric. [Madrid] 9: 202–203. 1919.—75,000 quintals of oil are produced annually from rice by-products in Italy. This is used for soap, glycerine, and other similar products.—*John A. Stevenson.*

1326. ANONYMOUS. El trigo. [Wheat.] Informacion Agric. [Madrid] 9: 1–4. *2 fig.* 1919. —Considers the importance of wheat as a food, a comparison of it with other cereals in this respect, the consumption in various countries, prices, and a method for determining the grade of wheat flour.—*John A. Stevenson.*

1327. ANONYMOUS. Nomenclature of wheats grown in South Africa. Union of South Africa, Dept. Agric. Bull. 1 (Gen. Ser.). *15 p.* 1919.

1328. ANONYMOUS. Varieties and strains of corn for Connecticut. Connecticut [New Haven] Agric. Exp. Sta. and Storrs [Connecticut] Agric. Exp. Sta. Joint Bull. 2. *17 p.* 1919. —A report of progress.—*M. F. Abell.*

1329. ANONYMOUS. Maize experiments at the School of Agriculture and Experimental Farm, Potchefstroom. (Progress Report.) Union of South Africa, Dept. Agric. Bull. 81 (Local Ser.). *11 p. Pl. 1–3.* 1919.

1330. ANONYMOUS. Economic grasses. Agric. Jour. South Africa 9^{49}: 24–27. 1919.

1331. ANONYMOUS. Las cenizas en el cultivo pratense. [Ashes for clover growing.] Informacion Agric. [Madrid] 9: 204. 1919.—The value of ashes for clover and grasslands, because of their potash and lime content, particularly when mixed with phosphate, is considered.—*John A. Stevenson.*

1332. ANONYMOUS. Dos nuevas suertes de guisante de los campos obtenidas por seleccion en descendencias puras, en Noruega. [Two new types of field peas obtained by selection in Norway. Informacion Agric. [Madrid] 9: 11–12. 1919.—A review of work carried out in Norway. (Source of information not cited.)—*John A. Stevenson.*

1333. Anonymous. **Flue curing lemon bright tobacco leaf.** Jour. Dept. Agric. Victoria 17: 377–378. 1919.—The varieties giving best results by flue curing are Spotted Gum and Yellow Pryor.—*J. J. Skinner.*

1334. Anonymous. **Procedimiento para hacer germinar las semillas de dificil germinacion.** [**A method of germinating hard seeds.**] Informacion Agric. [Madrid] 9: 11. 1919.—Hot water at 50°–70°C. is recommended, the temperature varying with different types of seed.—*John A. Stevenson.*

1335. Anonymous. **Conveniencia economica de la plantacion de arboles en las praderas.** [**Economic advantage of tree plantations on prairies.**] Informacion Agric. [Madrid] 9: 109–110. 1919.—A review of experiments conducted on the plains of Russia in growing legumes and other crops continuously and in rotation with trees. (Original source of information not cited.)—*John A. Stevenson.*

1336. Anonymous. **The world and its food shortage. Part XI.** Tropical Life 15: 37–38. 1919.—A compilation discussing the value of the groundnut peanut (*Arachis hypogaea*) as a human food. A standard article called "nutramine" is made from the cake after the oil content has been lowered to about 5 per cent by first grinding the cake finely in an ordinary roller mill and then sieving the flour. This nut flour or "nutramine" is prepared for consumption usually by mixing it with wheat flour.—*H. N. Vinall.*

1337. Anonymous. **Sisal for selling. VI.** Tropical Life 15: 18–19. 1919.—A compilation discussing the kind of soils suited to the production of sisal. It is noted that sisal grows well on the Caicos Islands (attached administratively to Jamaica). The true sisal (*Agave sisalana*) was found growing there as early as 1889 and producing a fibre equal to the best Yucatan. The most productive sisal soil in these islands is that in which the geological foundation is wholly limestone.—*H. N. Vinall.*

1338. Anonymous. **Sisal for selling. VII.** Tropical Life 15: 34–35. 1919.—A compilation discussing the "Proposed Manurial and other Experiments for Sisal Plants in the Turks and Caicos Islands." The yields on the Caicos Islands are compared with those of Yucatan.—*H. N. Vinall.*

1339. Anonymous. **Sisal for selling. VIII.** Tropical Life 15: 67–68. 1919.—A discussion of soils and climates suited to sisal production, being a compilation of material from the article by Lyster Dewey on "The Principal Commercial Plant Fibres," in U. S. Dept. Agric. Yearbook 1903, and Bull. 4 Agric. Exp. Sta. of Hawaii by Frank E. Conter, 1903.—*H. N. Vinall.*

1340. Anonymous. **Sisal for selling. IX.** [Rev. of: Hoffmann, A. Tropicale Madagascar 19: 219–226. 1918.] Tropical Life 15: 86–87. 1919.—Contains instructions for the establishment of a nursery, also outline of a scheme for a sisal plantation in Madagascar. Mr. Hoffmann estimates that a capital of 200,000 francs is needed for a 200 hectare plantation on which a profit of 500 to 600 francs per hectare per year might be expected. A list of the known species of *Agave* is given with a short statement regarding the climatic and soil adaptations of each.—*H. N. Vinall.*

1341. Anonymous. **Guinea corn as a fodder crop.** Agric. News [Barbados] 18: 103. April 5, 1919.—Agronomic notes on this crop in Jamaica, compiled from a lecture by L. L. Carrington published in Jamaica Gleaner, February 27, 1919.—*C. V. Piper.*

1342. Anonymous. **Clidemia hirta—a noxious weed in Fiji.** Agric. News [Barbados] 18: 137. May 3, 1919.—This tropical American plant is reported in a letter from the Fiji government to the government of British Guiana as having become an agricultural pest in Fiji, where it is known as Kösters Curse. It is said not to be troublesome in the West Indies. —*C. V. Piper.*

1343. Anonymous. **The grain sorghums.** Agric. News [Barbados] 18: 29. Jan. 25, 1919.—General historic and agronomic notes. Mazzagua guinea corn, a variety introduced in 1903 from Nigeria, is reported a fine cropper in the Leeward Island.—*C. V. Piper.*

1344. Anonymous. [W. N. Sands.] **The mahoe cockon tree in relation to cotton stainer control in St. Vincent.** Agric. News [Barbados] 18: 154–155. May 17, 1919.—See Bot. Absts. 3, Entry 932.

1345. Anonymous. **Casuarina woods in Mauritius.** Agric. News [Barbados] 18: 51. Feb. 22, 1919.—See Bot. Absts. 3, Entry 930.

1346. Anonymous. **Agricultural production.** Official Year Book, Union of South Africa 2: 432–445. 1919.—This is an account of the agricultural resources of the Union, the present production and possibilities of development. The following are dealt with in detail:—cultivation of cereals, fruit cultivation, viticulture, sugar industry, production of tea, cotton, and lucerne growing.—*E. M. Doidge.*

1347. Anonymous. **Agricultural schools and experiment farms.** Official Year Book, Union of South Africa 2: 448–450. 1919.—See Bot. Absts. 3, Entry 1898.

1348. Appel, O. **Die Pflanzkartoffel. [The potato plant.]** Landw. Hefte 36: *39 p., 7 fig.* Paul Parey: Berlin, 1918.—Short treatise on the potato, its origin, varieties, diseases, improvement, propagation, storage, etc. Sixteen diseases are described and seven are illustrated.—*D. Reddick.*

1349. Atkinson, Alfred. **Farm pastures in Montana.** Montana Agric. Exp. Sta. Circ. 82: 61–68. 1919.—This paper presents a brief discussion of some methods of seeding and of seed mixtures recommended for pastures and summer feed under dry and irrigated farm conditions. For summer silage, corn and mammoth Russian sunflower are recommended.—*H. E. Morris.*

1350. Barber, C. A. **Reminiscences of sugar cane work in India.** International Sugar Jour. 21: 390–395. 1919.—See Bot. Absts.

1351. Barthe, A. E. **Organizacion moderna de los campos experimentales. III. Eliminacion de errores en los ensayos culturales. [Elimination of experimental errors.]** Revist. Agric. Com. y Trab. 2: 347–355. *Fig. 1–9.* 1919.—A discussion of the difference between demonstration and experimentation, the need of a national institute of agronomy in Cuba, methods of eliminating errors in field experiments through size and arrangement of plats, and the use of computing the probable error.—*F. M. Blodgett.*

1352. Calvino, Mario. **Una leguminosa gigantesca como yerba forrajera para Cuba. La "Mermelada de caballo" del Brasil. Meibomia leiocarpa. [A Brazilian legume as a forage plant for Cuba.]** Revist. Agric. Com. y Trab. 2: 308–316. *7 fig.* 1919.—Trials of this plant in Cuba indicate that it is a valuable forage plant for Cuba because of high yield and high food value. Other related plants are described and compared. Tests indicate that it may be of some use as a textile plant.—*F. M. Blodgett.*

1353. Carballo, Enrique. **Instrucciones para los ensayos relativos al cultivo del ricino. [Instructions for experiments relative to the cultivation of the castor bean.]** Informacion Agric. [Madrid] 9: 55–57. *1 fig.* 1919.—A compilation covering the cultivation of the castor bean in Spain, including desirable soil types, temperature requirements, cultivation methods, and manner of harvesting.—*John A. Stevenson.*

1354. Claassen, P. W. **A possible new source of food supply.** Sci. Monthly 9: 179–185. *4 fig.* 1919.—Probably when the Indians were teaching the white man the use of corn and the potato he did not like them. Other Indian foods received little or no attention.—Cat-tail

(*Typha*) rhizomes dried and pulverized were used by the Indians as a sweet flour for making bread and pudding; bruised and boiled fresh they made a syrupy gluten in which corn meal pudding was mixed. J. D. Hooker states that Typha pollen is made into bread by the natives of Scind and New Zealand.—This plant is found in large quantities in what is usually considered waste ground. The rhizomes form a network 3 to 4 inches under ground and measure ¾ to 1 inch in diameter. The starch is found in almost a solid mass in the center of the rhizome. Based on a square-yard determination, the yield would approximate 5500 pounds of flour per acre.—A comparison of cat-tail flour with other flours shows a very similar composition. Puddings and biscuit were made with 33, 50 and 100 per cent cat-tail flour and the flavor was pleasing.—Questions of cultivation and practical methods of separating the flour need further investigation.—*L. Pace.*

1355. Cockayne, A. H. **Cocksfoot: Its establishment and maintenance in pasture.** New Zealand Jour. Agric. **18:** 257–271. *Fig. 1–12.* 1919.—This grass (*Dactylis glomerata*) is one of the most important used in the formation of New Zealand pastures on account of its large yield, high degree of palatability, varied adaptations to soil and climate, and its great persistence. It is not used so much for short rotation pastures as for those of long duration. Cocksfoot has two great disadvantages (1) its tussocky growth-form and (2) almost complete stoppage of growth during the winter. On steep slopes it does not last long unless in mixture with turf forming grasses such as *Poa pratensis* and crested dogs-tail. When subjected to continuous grazing (the usual practice in New Zealand grassland) seed is rarely produced. Approximately 2000 tons of cocksfoot seed are sown annually in New Zealand. A good crop of seed of this species will average 150 to 200 pounds per acre.—*E. R. Hodson.*

1356. Cruz, Jose. **El abonado de la remolacha.** [**Fertilization of the sugar beet.**] Informacion Agric. [Madrid] **9:** 171–173. 1919.—See. Bot. Absts. 3, Entry 1784.

1357. DeOng, E. R. **Effect of excessive sterilization measures on the germination of seeds.** Jour. Econ. Entomol. **12:** 343–345. 1919.

1358. Dibble, W. **Seed-Potatoes: Experiment at Weraroa, regarding size, etc.** New Zealand Jour. Agric. **18:** 297–298. 1919.—The objects were to find out the most profitable and economical size of cut or whole potato for seed purposes, and the best depth to plant the seed as a preventive against blight. It is concluded that cut seed-tubers deeply planted in well prepared and drained soil, give the best results.—*E. R. Hodson.*

1359. Doblas, José Herrera. **Seleccion de semillas.** [**Seed selection.**] Bol. Assoc. Agric. España **11:** 90–95. 1919.—The importance of seed selection to the agriculturists of Spain, based on search for and use of seed from plants found resistant to drought and poor soil (the unfavorable conditions most common) is emphasized.—*John A. Stevenson.*

1360. Findlay, Wm. M. **Red clover.** North Scotland Coll. Agric. Bull. 24. *39 p.* 1919. The failure to obtain a stand of red clover is attributed to three causes: (1) Poor or unadapted seed, (2) Unfavorable soil, (3) Competition of nurse crop or other plants in meadow or pasture mixture. English late-flowering (*Trifolium perenne*) and English broad-leafed (*T. pratense*) clovers from colder or more northerly regions are best adapted for northern Scotland. Too thick seeding of the nurse crop, and the use of rapidly growing grasses such as Italian rye-grass in the meadow or pasture mixture reduces the stand of clover. Lack of potash and lime, not phosphates, is the limiting fertilizer factor. Clover after potatoes was better than after turnips. The amount of soil moisture was less after late pulled turnips, and on unmanured soils.—*M. F. Abell.*

1361. Findlay, Wm. M. **The size of seed.** North Scotland Coll. Agric. Bull. 23. *15 p.* 1919. Large and small seed of various crops were compared under two heads: (1) Differences in yield due to different sized seeds in the same sample. (2) Differences in yield due to different sized seeds in different samples of the same variety. Results showed increases the first year in the first group, and variation in the latter group, the variation being ascribed to the greater influence on yield of strain and origin than of size of seed.—*M. F. Abell.*

1362. FRYER, J. R. Germination of oats exposed to varying degrees of frost at different stages of maturity. Agric. Gaz. Canada 6: 337–339. 1919.—Oat plots were sown in series at the Lacombe Experimental Station in order that when frosts should occur in the fall the different plots would be in various stages of maturity. The effect of frost, ranging from 2.3° to 8°F., on germination was studied, the maturity of the oat kernel ranging from the milk stage through various stages to the dry and mealy one. A frost of 2.3°F. did not impair vitality in stages ranging from milk to dough. A heavier frost of 4.6°, accompanied by a heavy dew, did not lower vitality in stages from milk to mealy. A frost of 5° followed by one of 8° the next night reduced vitality considerably in the milk and dough stages.—*O. W. Dynes.*

1363. GAVILAN, JUAN. El problema de las textiles. [Problem of the textiles.] Informacion Agric. [Madrid] 9: 49–51. *1 fig.* 1919.—The importance of textiles to the world and in particular of cotton is considered. Spain, unlike France and England, cannot draw on colonies for raw material for her textile factories. Experiments have shown that heavy yields of cotton can be obtained in Spain but present tariff protection is considered insufficient. —*John A. Stevenson.*

1364. GAVILAN, JUAN. Nitrato de sosa de Chile. [Chilean nitrate.] Informacion Agric. [Madrid] 9: 25–29. *5 fig.* 1919.—See Bot. Absts. 3, Entry 1798.

1365. GUZMANES, ANTONIO. La ortiga. [The nettle.] Informacion Agric. [Madrid] 9: 167–169. *2 fig.* 1919.—Two species (*Urtica dioica* and *U. nivea* [*Boehmeria nivea*] the latter from China) are commonly grown in Europe for their fiber content. The former is a common weed in Spain. The industry has been revived because of war conditions in Denmark and other parts of Europe. The plant is cultivated and the fiber obtained much the same as with flax and hemp.—*John A. Stevenson.*

1366. HARRIS, WM. Notes on sisal and henequen in Jamaica. Jour. Jamaica Agric. Soc. 23: 46–50. 1919.—The cultivation of sisal (*Agave sisalana*) is considered, including manner of propagation, desirable types of soil, planting methods, care of the plantation, time and manner of harvesting, and finally the extraction, drying and baling of the fiber. A similar account is given for henequen (*Agave fourcroydes*), the common fiber plant of Yucatan.—*John A. Stevenson.*

1367. HAUTEFEUILLE, L. Le sisal en Afrique. [Sisal in Africa.] Jour. Agric. Tropic. 19: 260–263. 1919.—The production of *Agave rigida* var. *sisalana* in both East and West Africa is described.—*J. D. Luckett.*

1368. HERMAN, V. R. Soybeans and cowpeas for North Carolina. North Carolina Agric. Exp. Sta. Bull. 241. *40 p.* June, 1919.—This is a discussion of the following topics: cowpeas for hay, curing cowpea hay, cowpeas for seed, cowpeas for temporary pasture, cowpeas for soil improvement, cowpeas in rotation, cowpea culture, method of planting, fertilizers for cowpeas, inoculation, time to plant, diseases of cowpeas, insect enemies of cowpeas, variety tests, cowpea varieties, soybeans for hay, soybeans for seed, soybeans for pasture, soybeans for soil improvement, methods of culture, rate of seeding soybeans, fertilizer for soybeans, soybean culture experiment, soybean varieties, and cowpeas and soybeans compared.—*R. A. Jehle.*

1369. HILSON, G. R. 'Northerns' cotton. Agric. Jour. India 14: 300–314. 1919.—In order to improve the "Northerns" cotton; more time and research must be given to improve the plant; and the following features need attention: better harvesting and preparation for the market, better ginning, establishment of an open market to which *kapas* (unginned cotton) might be brought, and the establishment of ginneries properly fitted and constructed and either owned or controlled by the buying firms.—*F. M. Schertz.*

1370. Holmes-Smith, E. **Fibre plant investigations.** South African Jour. Indust. 2: 157–172. 1919.—Generally speaking the whole of the coastal area from the Transkei to Mossel Bay offers great possibilities for the development of fiber growing and fiber industries. It is recommended that sisal hemp, Mauritius hemp and New Zealand hemp should be extended and encouraged as far as possible. The climatic and soil conditions of this part of the Cape Province appear more suited to the growing of "hard fiber" than of "soft fiber" plants. The writer suggests that experimental plantations upon a moderate scale be laid down in the vicinity of Kei Bridge (Transkei), East London, Kingwilliamstown, Port Elizabeth, Uitenhage or Humansdorp, Knysna or George.—*E. P. Phillips.*

1371. Jardine, James T., and Mark Anderson. **Range management on the national forests.** U. S. Dept. Agric. Bull. 790, *98 p. 32 pl.* 1919.—See Bot. Absts. 3, Entry 1444.

1372. Keller, G. N. **Tobacco growing in Ireland. The experiments in 1918.** Jour. Dept. Agric. Ireland 19: 298–302. 1919.—Discusses various phases of culture, pests and diseases, and use.—*Donald Folsom.*

1373. Kiesselbach, T. A. **Forage crops.** Nebraska Agric. Exp. Sta. Bull. 169. *36 p. 8 fig.* 1918.—A brief description of the principal forage crops suitable for various Nebraska conditions is given, and cultural practices are outlined. The results of comparative forage-crop tests at the Experiment Station during three years, 1914–17, are tabulated.—During three years alfalfa cut for hay earlier than the normal stage of maturity, resulting in five seasonal cuttings instead of three or four, reduced the three years average yield from 5.57 tons to 3.7 tons per acre. Such frequent cutting decidedly reduced the vigor and number of plants. The yield of alfalfa cut less than the normal number of times was reduced to 3.43 tons for two cuttings in contrast to 5.57 tons normal. After three years' cumulative effect of cutting-frequency, all the alfalfa was cut a fourth season at the normal stage of maturity with the following results: (1) previous normal cutting yielded 3.40 tons; (2) previous too-frequent cutting 2.16 tons; (3) previous insufficient cutting 3.11 tons.—*T. A. Kiesselbach.*

1374. Lee, S. C. **Electrical treatment of seed.** Agric. Gaz. Canada 6: 173–175. 1919.

1375. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. June, 1919. [Serial no. 16.]—Method for comparing net photosynthetic activity of different varieties under same conditions, or of same variety under different conditions. [See Bot. Absts. 3, Entries 2685, 2833; 4, Entry 241.]—*B. E. Livingston.*

1376. Lyon, T. L. **Experiments in fertilizing a crop rotation.** New York Agric. Exp. Sta. [Cornell] Bull. 399: 19–30. Feb., 1919.

1377. MacDermott, F. D. **Agricultural and pastoral South Africa.** South African Jour. Indust. 2: 419–435. 1919.

1378. MacDermott, F. D. **Agricultural and pastoral South Africa.** South African Jour. Indust. 2: 505–519. 1919.

1379. Main, F. [Rev. of: Fauchère, A. **Guide pratique d'agriculture tropicale.** *159 p.* Paris: Augustinn Challamel. 1918.] Jour. Agric. Tropic. 19: (Bull. Bibliog.): 127. 1919.—A treatise on the development of agriculture in French colonial possessions.—*J. D. Luckett.*

1380. Malte, M. O. **Sugar content and its relation to winter hardiness.** [Rev. of: Akerman, A., Hj. Johansson, and B. Platon. Fortsatta Undersökningar Rörande Sockerhalt och Torrsubstanshalt hos Några Höstvetesorter, Sveriges Utsadesforenings Tidskrift (Jour. Swedish Seed Assoc.) 28: 216–224. 1918.] Agric. Gaz. Canada 6: 329–331. 1919.—Four varieties of winter wheat with varying degrees of winter hardiness were grown together under uniform conditions and analyzed for their sugar contents at various times during the growing period. A direct correlation was found between winter hardiness and high sugar content or the amount of reducing substances in the plant cells.—*O. W. Dynes.*

1381. Matthews, W. H. The agricultural progress of the pomeroon between the years 1905–1917. Jour. Bd. Agric. British Guiana 12: 6–10. 1919.

1382. McCulloch, W. J. Ensilage in Southland: Demonstration at Gore experimental area. New Zealand Jour. Agric. 18: 281–287. *Fig. 1.* 1919.

1383. Melle, H. A. Kikuyu grass (Pennisetum longistylum Höchst.). Agric. Jour. South Africa 9^{53}: 29–33. *1 fig.* 1919.—Reprinted from Union of South Africa, Dept. Agric Bull. Local Ser. 45: 1–7. 1918.

1384. Metge, G. [Rev. of: Kraus, C. Erfahrungen beim Anbau der Sonnenblume. (Experiences in the culture of the sunflower.) Deutsch. Landw. Presse 44: 455–466. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 256–258. 1918.—The amount of oil produced by the sunflower was found to be low when compared with that obtained from other crops, as rape and poppy. The author apparently does not advise cultivation of the sunflower for oil, either in small plots or on a large scale, for the plot experimented on barely paid expenses. —*F. M. Schertz.*

1385. Metge, G. [Rev. of: Clausen. Die Bodenausnutzung durch die Kartoffel bei kleinen und grossen Saatknollen und bei enger und weiter Pflanzenzweite. (Utilization of the soil by the use of large and small seed potato tubers and by close and wide spacing.) Illustr. Landw. Zeitg. 37: 108–109. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 285. 1918. —The author obtained 20,000 pounds more per hectare by using large potato tubers for seed than when he used small ones. Large tubers as seed are especially recommended for poor soil. Good results are secured if small seed potatoes are spaced close together in the rows while large ones are spaced farther apart (2 ft.).—*F. M. Schertz.*

1386. Metge, G. [Rev. of: Wagner, P. Wie wirkt die Saatgutbeschaffenheit auf den Kartoffelertrag unter dem Einfluss verschiedener Pflanzweite, Düngung und Jahreswitterung. (Influence of the seed stock on the yield of potatoes under the influence of different distances of planting, manuring and weather.) Deutsch. Landw. Presse 45: 169, 175–176, 183. 1918.] Biedermann's Zentralbl. Agrikulturchem. 47: 325–333. 1918.—The author conducted field experiments on sandy soil and on loam. His results from loam soil are as follows: Whole potatoes of 50 grams weight under unfavorable weather and bad nutrient relations gave less yield than whole potatoes of 75 grams weight. Stronger fertilizing or better weather was able, to a large extent, to make the difference in yield not so great. Under the favorable conditions of the year 1917 the small (50 grams) and the cut potatoes (60 grams) yielded from 12 to 18 per cent less than the larger whole potatoes (75 grams). Experiments on sandy soil were conducted according to the following scheme: (1) Small potatoes of 50 grams weight. (2) Large potatoes of 70 grams weight. (3) Half potatoes of 60 grams weight. (4) Alternately a large and a small potato. (5) Alternately a large, a small and a half potato. The tubers were planted according to three schemes as to spacing. (1) 60 by 49.0 cm. apart. (2) 60 by 55.5 cm. apart. (3) 60 by 59.5 cm. apart. Three different mixtures of fertilizers were used. (7) Potassium phosphate without nitrogen. (2) Potassium phosphate with 46.5 grams of nitrogen as ammonia. (3) Same as 2, only using 77.5 grams of nitrogen as ammonia. Conclusions are: (1) The half potatoes gave a considerably inferior yield than the whole potatoes. (2) The increased nitrogen fertilizer gave an increase in the potato yield. (3) 50-gram potatoes gave a yield slightly superior to 70-gram potatoes. (4) The greater yield was obtained when large and small potatoes were planted alternately. The smallest yield was obtained when the potatoes were cut. Spacing the plants 60 by 49.0 cm. gave a yield of 502 hundredweight per hectare, 60 by 55.5 cm. yielded 512 hundredweight, and 60 by 59.5 cm. yielded 520 hundredweight. Hence the wider spacings were progressively more productive—*F. M. Schertz.*

1387. Meunissier, A. Le tabac en Indo-Chine et à Maurice. [Tobacco in Indo-China and Mauritius.] Jour. Agric. Tropic. 19: 263–265. 1919.—A brief description of the industry —*J. D. Luckett.*

1388. Mottet, S. **Pommes de terre de grande consommation. [Principally used potatoes.]** Revue Horticole 91: 232–234. *1 pl. (colored).* Feb., 1919.—A critically descriptive list of several mid-season and late varieties of potatoes. The author states that he has previously published two other articles on the same subject.—*E. J. Kraus.*

1389. Mullet, H. A. **Lolium subulatum, Vis., "Wimmera" rye-grass.** Jour. Dept. Agric. Victoria 17: 266–278. *Fig. 6.* 1919.—A hardy species of rye-grass hitherto unrecorded in Victoria, and of great promise for sowing of pastures in the wheat belt. The root system is fibrous and extremely vigorous. The seed is larger and plumper than average samples of rye-grass, and is capable of retaining its vitality for several years. Propagation is by seed only. The stems possess the usual purplish base characteristic of rye grass. The grass does better on the red clays than on friable black soils. It is stated that *Lolium subulatum* will double the stock carrying capacity of the present Mallee pastures.—*J. J. Skinner.*

1390. Müller, B. [Rev. of: Ranninger, Rudolf. **Die Kultur des Mohnes. [Culture of poppies.]** Nachr. Deutsch. Landw. Ges. Österreich 1917[10]: 89. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 254–256. 1918.—Poppies were planted in rows respectively 60, 50, 40, 30, 20, and 10 cm. wide while the plants in the rows were respectively 50, 40, 30, 20, 10, and 5 cm. apart. Rows 30 cm. wide and plants 20 cm. apart in the rows gave very favorable results, for most of the plants produced 3 to 4 capsules. Descriptions are given of the care of the plants and the collection of the capsules. The yield averaged about 1700 pounds per hectare. The weight of a hectoliter varied from 56 to 63 kg.—*F. M. Schertz.*

1391. Müller, B. [Rev. of: Koritschoner, Fr. **Die Quecke als Malzersatz in der Brauindustrie. (Couch grass in brewing.)** Chemiker Zeitg. 41: 797–798. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 277–279. 1918.—In Germany it was proposed to use the rhizome of couch grass (*Triticum repens L.*) in the brewing industry, because of the scarcity of malt. The dried rhizome yields 20 per cent of extract which is derived chiefly from the reserve carbohydrate triticin, which forms levulose on hydrolysis. Difficulties in manufacture were great and the beers thus brewed were undrinkable after storage.—*F. M. Schertz.*

1392. Nobbs, Eric A. **Maize grading in southern Rhodesia.** Rhodesia Agric. Jour. 16: 5–17. 1919.

1393. Pando y Armand, Luis de. **El cultivo del ricino en secano y sin abonas. [Cultivation of the castor bean in dry lands without fertilizers.]** Bol. Asoc. Agric. España 11: 96–99. 1919.—Satisfactory yields were obtained with *Ricinus sanguineus* in an area of scanty rainfall (province of Alicante, Spain) without the use of fertilizers. Methods of planting, cultivation, and harvesting are given.—*John A. Stevenson.*

1394. Pole Evans, I. B., and K. Lansdell. **The weeds of South Africa. IV. The Imbricate Cactus (Opuntia imbricata Haw. Family, Cactaceae.)** Union South Africa, Dept. Agric. Bull. Local Ser. 76. 1919.

1395. Pole Evans, I. B., and K. Lansdell. **The weeds of South Africa. VI. The khaki-weed, Alternanthera Achyrantha R. Br. (Family, Amarantaceae).** Union South Africa, Dept. Agric. Bull. Local Ser. 73. *1 p.* 1919.—Popular.

1396. Pole Evans, I. B., and K. Lansdell. **The weeds of South Africa. VII. The cockle-bur or kanker-roos, Xanthium occidentale L. (Family, Compositae).** Union South Africa Dept. Agric. Bull. Local Ser. 74. *1 p.* 1919.—Popular.

1397. Pole Evans, I. B., and K. Lansdell. **The weeds of South Africa. VIII. The jointed cactus, Opuntia aurantica Gilles. (Family Cactaceae).** Union South Africa, Dept. Agric. Bull. Local Ser. 75. *1 p.* 1919.—Popular.

1398. Richter. [Rev. of: Fallada, O. Zur Rübensamenbeizung mit Schwefelsäure. (Germination of beet seed after corrosion with sulphuric acid.) Oesterreich-Ungar. Zeitschr. Zuckerindust. und Landw. 22: 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 324–325. 1918.

1399. Ritzema Bos, J. Boekbespreking. [Book review.] [Rev. of: Heidema, J. Bestrijding van Onkruiden. (Combatting weeds.) *2 ed., price 35 florins.* J. B. Walters: Groningen and The Hague.] Tijdschr. Plantenz. 24: 220. 1918.

1400. Robbins, W. W., and Breeze Boyack. The identification and control of Colorado weeds. Colorado Agric. Exp. Sta. Bull. 251. *123 p., 77 fig.* 1919.—This bulletin discusses the legal aspect of weed control, pure seed, losses caused by weeds, nature of weeds, principles of weed control, weeds as ensilage. Descriptions and illustrations of the principal Colorado weeds constitute the larger part of the bulletin.—*Walter G. Sackett.*

1401. Sampson, Arthur W. Plant succession in relation to range management. U. S. Dept. Agric. Bull. 791. *76p., 26 fig.* 1919.—See Bot. Absts. 4, Entry 380.

1402. Schatzlein. [Rev. of: Sidenius, E. Düngungsversuche zu Tabak 1915 bis 1916. (Fertilizer experiments on tobacco, 1915–1916.) Mededeel. Proefstat. Vorstenlandsche Tabak 26: 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 318–320. 1918.—See Bot. Absts. 3, Entry 1790.

1403. Scherffius, W. H. Notes to cotton growers. Agric. Jour. South Africa 9^5: 35–37. *2 fig.* 1919.

1404. Schribaux, F. Sobre las siembras tardias de remolachas. [Concerning late sowing of sugar beets.] Informacion Agric. [Madrid] 9: 198–199. 1919.—As a means of overcoming delay in sowing, due to scarcity of labor, soaking the seeds for from two to five days in advance of planting is recommended. The seeds are dried either in the sun or artificially and are planted immediately, although there is no injury if sowing is delayed a day or so.—*John A. Stevenson.*

1405. Shaw-Scott, G. Prospects of hop-growing in South Africa. South African Jour. Indust. 2: 519–533. 1919.

1406. Southworth, W. Development of fodder corn. Agric. Gaz. Canada 6: 258–261. *Fig. 1–2.* 1919.—Several years test for yield of a number of northern grown varieties of corn (maize) is presented.—*O. W. Dynes.*

1407. Spafford, R. R. Farm types in Nebraska as determined by climatic, soil and economic factors. Nebraska Agric. Exp. Sta. Res. Bull. 15. *37 fig.* 1919.—Nebraska agricultural areas as determined by climate, soil and economic factors, are chiefly considered. The data are mostly taken from the Thirteenth Census of the United States. The paper deals mainly with the kinds of crops grown and their yields.—It is concluded that temperature has the greatest effect in determining the boundaries of crop types, but that rainfall, soil and economic conditions can have a marked influence.—*T. A. Kiesselbach.*

1408. Taylor, H. W. Cotton culture. Rhodesia Agric. Jour. 16: 197–201. 1919.

1409. Taylor, H. W. Tobacco cultivation. The importance of selecting seed plants and grading seed. Rhodesia Agric. Jour. 16: 18–23. 1919.

1410. Thomas, Roger. The improvement of "Tinnevellies" cotton. Agric. Jour. India 14: 315–330. 1919.—The paper deals with the work done, up to the end of the 1917 season, on the selection, propagation and marketing of unit strain selections of cotton in the ('Tinny' tract) three southernmost districts of the Madras Presidency. An attempt is being made to

eradicate from the "Tinny" tract a low-grade cotton (a variety of *Gossypium neglectum*) locally known as '*pulichai*.' Drill cultivation is being introduced and drill sowing and interculturing implements are being manufactured.—*F. M. Schertz.*

1411. Tuero, F. **Cultivo del agave americano ó pita. [Cultivation of the American agave.]** Informacion Agric. [Madrid] **9**: 32.–37 *1 fig.* 1919.—A compilation dealing with the desirable climate and soils for growing the agave in Spain, methods of planting, cultivation, harvesting, extracting and packing the fiber, and the expenses and profits of the undertaking. Brief notes on the uses of various parts of the plant are included.—*John A. Stevenson.*

1412. Volhard, J. [Rev. of: Heinrich, M. **Versuche zur Verbesserung dumpfigen Getreides. (Investigation for the improvement of musty grain.)** Versuchsstat. **90**: 49–67. 1917.] Biedermann's Zentralbl. Agrikulturchem. **47**: 273–76. 1918.—A powder evidently containing calcium or magnesium oxide mixed with a bicarbonate was recommended for the treatment of musty grain. The author states that the powder did not cause any great lowering of the moisture content of either dry or moist oats.—*F. M. Schertz.*

1413. Walters, J. A. T. **Improvement of the veld by artificial means.** Rhodesia Agric. Jour. **16**: 32–36. 1919.—The four characteristics which distinguish the Rhodesian veld and restrict its stock-carrying capacity are: (1) The prevalence of sour grasses (i.e. grasses that are fibrous in texture, wiry to the touch and not unfrequently with an objectionable odor. (2) The scarcity of edible legumes. (3) The early-maturing nature of the grasses. (4) The occurrence of a long winter drought. The lack of succulence in winter can be overcome by planting Napier fodder and other similar plants and by providing ensilage; the absence of legumes can be obviated by the growing of various perennials. A permanent hay crop is provided by molasses grass and it is more than probable that Kikuyu grass from British East Africa will prove the basis of a short pasturage which will be of great value for both sheep and cattle.—*E. M. Doidge.*

1414. Weingart, W. **Kleine Mitteilungen. [Minor contributions.]** Monatsschr. Kakteenk. **29**: 10. 1919.—See Bot. Absts. 3, Entries 3028, 3029.

1415. Williams, C. B. **Report of the division of agronomy.** North Carolina Agric. Exp. Sta. Ann. Rept. **41**: 22–35. [1919.]—This is a brief report of work on mapping and analyzing soils, soil fertility experiments, cotton breeding investigations, crop improvement, tests with varieties of field crops, and miscellaneous tests with tobacco.—*R. A. Jehle.*

1416. Wood, R. Cecil. **Some agricultural aspects of the Hosur Remount Depot.** Agric. Jour. India **14**: 291–295. 1919. For the remount depot the author recommends the growing of mixed fodder crops.—*F. M Schertz.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

1417. Peirce, George J. **What kinds of botany does the world need now?** Science **49**: 81–84. Jan., 1919.—In this address (delivered at the meeting of the San Francisco Bay Section, Western Society of Naturalists) the author calls attention to the fact that, with the termination of the war, the obligation falls upon scientific men to review their sciences, and to consider the relations of science to human life, human needs and human ideals. The world has little idea of what botany really is or what its devotees are trying to accomplish. The various branches of botanical science—forestry, bacteriology, horticulture, agriculture—have, themselves, forgotten their origin, and men engaged in these fields have ceased to realize that they are applying what has been learned by investigations of the few. Pure science should not be neglected merely because the world is hungry, but because the world is hungry botanists may be able to make an estimate of what parts of the field of study are likely to help

most to relieve present needs. The world possibly may not have been so hungry today if botanists had reflected more upon the processes of nutrition in plants. Food can be made, and made so near points of maximum consumption, that problems of transportation can be greatly reduced, if the kinds of food and methods of culture are more accurately adjusted to the demand.—*A. H. Chivers.*

1418. Pool, Raymond J. **About high-school and college botany.** School Sci. Math. 19: 487–500. June, 1919.—Botany, the "sick man" of the high-school curriculum, is on the very edge of dissolution. We have a far greater field for teaching the science of plants if we take it more freely to those phases of world life and society dependent upon plants than if we confine it to the *Pleurococcus-Taraxacum* gamut and to the gametophyte-sporophyte intricacies of the plant phyla. High schools should shelve some of their microscopes and get down to the living, growing, producing plant and its vital relation to this storm-tossed world. We have got to do this or others will do it for us. Suggested course: (1) The leaf: anatomy, growth, water-loss, photosynthesis, uses. (2) Roots: structure, physiology, development. (3) Stem: wood, fibers, pruning, grafting. (4) Flower: forms, sex-organs, commercial value. (5) Seed and fruit: kinds, food content, production, dissemination. (6) Ecology: plant communities and distribution. (7) Main groups of plants, evolution. (8) Plant-diseases: causes, symptoms, control. (9) Weeds: damage, kinds, dissemination, eradication. (10) Flowering plants: principles of classification, important economic groups and species.—*A. Gundersen.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

1419. Anonymous. **Forest investigation.** Amer. Forestry 25: 1218–1219. 1919.—There has been a growing conviction on the part of foresters in the United States that the amount of silvical research conducted by all agencies, including the Federal Government, is very inadequate. Problems exist in the southern pine region, the hardwood region in the Appalachians and neighboring States, the Lake States, New England and the West.—*Chas. H. Otis.*

1420. Anonymous. **Forests.** Official Year Book, Union South Africa 2: 451–458. 1919. —This is a general survey of the nature and extent of the timber forests of the Union, the policy of the Government with regard to the forests and the production and importation of timber. A list is given of indigenous trees reserved under the Forest Act, No. 16 of 1913.—*E. M. Doidge.*

1421. Anonymous. **A national forest policy—why and how.** Amer. Forestry 25: 1049–1052. 1919.—An article made up largely of quotations from speeches by Henry S. Graves, Forester, United States Forest Service, incorporating lumbering statistics of importance and his ideas of a future forest policy.—*Chas. H. Otis.*

1422. Anonymous. **Report on the Botanical and Forestry Department for the year 1917.** [Hong Kong, China.] *18 p.* [Received in U. S. August, 1918.]—A collection of short notes dealing with the administration of this department and primarily of local interest. The notes deal with activities in connection with the Botanical Gardens and various grounds and nurseries in charge of the superintendent. The forestry activities include the formation of pine and broad-leaved tree plantations; the care of such plantations; the protection of forests from fire and insect damages; the planting and care of roadside trees; the making and repairing of roads and paths; and other activities of less importance. Appended to the report are seven tables and a supplement. The tables deal with the rainfall of the current year; a classification of the offences committed against the forestry laws; the results of bringing these cases before the police courts; a list of flowering trees and shrubs planted; and various matters dealing with expenditures and revenues. The supplement enumerates 15 species of

plants added during the year to the flora of Hong Kong and adjacent territory.—The report discloses that the total rainfall at the Botanical Gardens for the year was 85.51 inches of which almost 33 inches fell in July. Typhoon signals were hoisted four times and considerable damage was done by these storms to the vegetation. Species of *Melaleuca, Casuarina, Eucalyptus, Tristania, Aleurites,* and *Celtis* were planted for forestry purposes. The clearing of undergrowth at Government expense for anti-malarial purposes amounted to over 5,000,000 square feet. The revenue amounts to only 14 per cent of the annual expenditures in this department.—*Richard H. D. Boerker.*

1423. Anonymous. **The rubber industry of the future.** Tropical Life **15**: 41–42. 1919. —Chiefly comment regarding a paper on "The rubber industry—past and present" presented by B. D. Porritt (Chief Chemist to the North British Rubber Company, Ltd., of Edinburgh) before the Royal Soceity of Arts. Of interest is a tabulation by countries of the consumption of raw rubber in 1917. The United States consumed 69 per cent of the total against 10.2 per cent by Great Britain.—*H. N. Vinall.*

1424. Anonymous. **Transplanting large trees.** Amer. Forestry **25**: 1198. 1919.—In transplanting mature trees the chances of success are best with elm; but maple, horse chestnut, catalpa, ash, linden, willow, poplar and pin oak can be transplanted with more or less success if the proper methods are employed.—*Chas. H. Otis.*

1425. Babbitt, W. H. **Uncle Sam, lumberman, Canal Zone.** Amer. Forestry **25**: 1265–1267. *5 fig.* 1919.—A description of the saw-mill and lumber business operated by the United States Government on the Panama Canal Zone, with notes on the characteristics of the trees of the region, especially espavay, lignum-vitae, níspero or bullet-tree and almendra.—*Chas. H. Otis.*

1426. Beeson, C. F. C. **The food plants of Indian forest insects. Part II.** Indian Forester **45**: 139–153. 1919.—A continuation of work previously noted.—*E. N. Munns.*

1427. Brown, Nelson Courtlandt. **Forestry and the war in Italy.** Jour. Forestry **17**: 408–412. 1919.—The forest resource of Italy suffered heavily during the war because of the lack of imports, increased demands from industry, the lack of a coal supply, and destruction in battle. The future supply will have to come largely from plantations to the extent of some 30 per cent of the area of the country.—*E. N. Munns.*

1428. Chandler, B. A. **Results of cutting at Ne-ha-sa-ne Park in the Adirondacks.** Jour. Forestry **17**: 378–385. *Fig. 1–3.* 1919.—The working plan for the mixed conifer and hardwood forest in 1898 failed to give the results looked for, as hardwoods took advantage of the spruce which is competing with other plants throughout its life. Hardwoods seeded down better, grew more readily, and responded to environmental changes more rapidly than did spruce. Apparently management for spruce demands intensive methods, cutting hardwoods as closely as possible and freeing spruce unless badly suppressed. The diameter limit of cutting is a failure, and favors hardwoods. The best method is probably clear-cutting and planting.—*E. N. Munns.*

1429. Clapp, Earle H. **Forest research and the war.** Jour. Forestry **17**: 260–272. 1919. —During the war period the activities of the research branch of the U. S. Forest Service were spread to include practically every use of wood in modern warfare in addition to non-military uses. Savings to the government in the two years of war more than paid for all the money which has been expended without attempting to measure the indirect benefits. The great need for further investigations is emphasized.—*E. N. Munns.*

1430. Cremata, Merlino. **Cercas, alambradas y setos en Cuba.** [Fences and hedges in **Cuba.**] Revist. Agric. Com. y Trab. 2: 330–334. 1919.—See Bot. Absts. 3, Entry 2254.

1431. CROZIER, R. H. **The cultivation of eucalypt trees.** South African Jour. Indust. 2: 234–238. 1919.—Of the numerous species of *Eucalyptus*, many produce timber of exceptional value, often unequalled for special purposes by any other timber in the world. They can be utilized to advantage where lightness is not an essential and where their hardness is not a serious drawback. The following species possess qualities of strength, durability, or rapidity of growth which warrant their extensive cultivation: *Eucalyptus cornuta, E. gomphocephala, E. redunca, E. sideroxylon, E. paniculata, E. staigeriana, E. hemiphloia, E. rostrata, E. resinifera. E. muelleriana, E. botryoides* and *E. delagatensis.—E. P. Phillips.*

1432. CROZIER, R. H. **The properties and characteristics of some eucalypt trees and their suitability for cultivation.** South African Jour. Indust. 2: 62–73. 1919.—*Eucalyptus marginata* (Jarrah) yields an exceedingly durable timber; it is largely used for piles in sea water and in damp ground, and is in demand for railway sleepers, street blocks, etc. The timber from *E. diversicolor* (Karri) is used for shafts, spokes, felloes, etc. The green-colored timber from *E. gomphocephala* (Tuart) seasons fairly rapidly and shrinks remarkably little during the process; it is hard, tough and dense, and is used for framework of railway wagons, skips, beams, etc. The timbers of *E. redunca* (Wandoo), *E. loxophleba* (York gum), *E. salmonophloia* (Salmon Gum), *E. longicornis* (Morrell) season slowly and shrink to a comparatively small extent. *E. patens, E. calophylla, E. cornuta, E. paniculata, E. crebra, E. siderophloia, E. sideroxylon, E. staigeriana, E. microcorys, E. pilularis, E. maculata, E. saligna, E. propinqua, E. hemiphloia, E. longifolia, E. hemilampra, E. regnans, E. delegatensis* and *E. corymbosa* are mentioned; the characteristics of their wood and the nature of the soil in which they grow are detailed.—*E. P. Phillips.*

1433. DEMORLAINE, J. **Strategic importance of forests in the war.** Amer. Forestry 25: 1040–1043. *3 fig.* 1919.—Translation by SAMUEL T. DANA from Rev. Eaux et Forets [Paris] Feb., 1919. Revised to date by PERCIVAL S. RIDSDALE.—*Chas. H. Otis.*

1434. FROMBLING, C. **Achtet der niederen Pflanzenwelt.** [Observe the lower plant forms.] Zeitschr. Forst.- u. Jagdw. 51: 33–37. 1919.—A short but highly instructive treatise on the importance of the lower plant forms as indicators of site quality and reforestation possibilities.—*Hermann Krauch.*

1435. GASKILL, A. **Control of growing forests.** Amer. Forestry 25: 1284. 1919.—(A contribution to the general topic "A national forest policy.") A policy to be truly national must have in mind the necessities of the nation as a whole, yet recognizing that the greater part of the forest lands in this country are in private possession and under State, not Federal, control. Before growing (not mature) timber can be considered a safe investment for private owners, three things must be established; first, the fitness of a given area for continued use (through one rotation at least) as forest; second, security against destruction; and third, assurance of the total, or ultimate, tax levy.—*Chas. H. Otis.*

1436. GRAVES, HENRY S. **A national lumber and forest policy.** Jour. Forestry 17: 351–363. 1919.—Halfway measures in handling the forest resource have failed, and will doubtless always fail, because of inherent weaknesses. Coöperation on the part of all agencies whose background is based on the lumber and forest resource is necessary to work out the adjustment of international relations, tax reforms, financial aids to the industry, while a policy of forest development making for permanency of operation, improvement in labor conditions, proper and regulated marketing, to encourage proper use of land is badly needed and of great importance to the public as a whole.—*E. N. Munns.*

1437. GRAVES, H. S. **The proposed legislation.** Amer. Forestry 25: 1281–1282. 1919.—(A contribution to the general topic "A national forest policy.") Any comprehensive program of forestry must involve the practice of forestry on privately owned timberlands. It is believed that success can be attained only through some plan of coöperation between the States and the Federal Government, with the States the active agents for carrying the plan

into effect and with the Federal Government stimulating action and aiding the States. Certain principles which should form the foundation of such a system are detailed.—*Chas. H. Otis.*

1438. Hall, William L. **Influence of the National forests in the southern Appalachians.** Jour. Forestry 17: 402–407. 1919. The establishments of national forests has aided in the industrial and social transition of the southern Appalachian region, the influence showing in the change in the local population, in improvements of industries, and in forest management.—*E. N. Munns.*

1439. Hawley, R. C. **Measuring cordwood in short lengths.** Jour. Forestry 17: 312–317. 1919.—Irregularities exist in the measurement of cordwood where long lengths are cut into short lengths, due to practices in wood yards and with the character of the wood. In southern Connecticut, the amount of actual wood in a cord is between 95 and 100 cubic feet for 12-inch wood, and between 100 and 110 cubic feet for 20-inch wood.—*E. N. Munns.*

1440. Hesselman, Henrik. **Iakttagelser över skogsträdspollens spridningsförmaga. [Dissemination of pollen from forest trees.]** Meddel. Statens Skogsförsöksanst. 16: 27–60. *Fig. 1–3.* 1919.

1441. Hole, R. S. **The regeneration of sal (Shorea robusta) forests.** Indian Forester 45: 119–132. 1919.—A combination of the group and strip systems is indicated as the best method of securing natural regeneration of sal (*Shorea robusta*), by which the cutting cycle will be reduced 35 years. Permanent strips three-fourths the height at maturity are laid out north and south, alternate strips to be cut off in rotation, the second strip after the reproduction has attained its height growth. The cutting is done in small patches during intervals of 5 years to permit regeneration to occur and keep weeds down. A modification later may prove necessary in working progressively by strips instead of alternating.—*E. N. Munns.*

1442. Howe, C. D. **Some reflections upon Canadian forestry problems.** Jour. Forestry 17: 290–296. 1919.—Much of the forestry practice in Europe is based on the rule of thumb rather than on the understanding of definite biological principles, and in America we are falling into the habit of jumping to conclusions without sufficient evidence. Substantial data, both intensive and extensive, are necessary to determine practices and to remedy unsatisfactory conditions.—*E. N. Munns.*

1443. Illick, J. S. **Preliminary report of some forest experiments in Pennsylvania.** Jour. Forestry 17: 297–311. 1919.—Plantations have been made of a number of tree species and of these the native pitch pine (*P. rigida*) has done the best and, from stem analyses, the tree is an exceedingly rapid grower. Plantations of white pine on cut-over chestnut lands in this region show that they will not make satisfactory stands unless sprout growth is removed, and unless the competing cover is removed under 10 years it is suppressed beyond recovery. Assistance cuttings given to young plantations are of decided benefit, though the cuttings may be only a lopping off of the interfering branches. Three conversion experiments are described somewhat in detail giving data showing the effect of the cover and the cuttings on plantations.—*E. N. Munns.*

1444. Jardine, James T., and Mark Anderson. **Range management on the national forests.** U. S. Dept. Agric. Bull. 790. *98 p., 32 pl.* 1919.—Discussion of the interrelations of grazing practice, range maintenance and game protection on the national forests. The relative adaptation of cattle, sheep, goats, and horses to various types of mountain and plain ranges is outlined, such factors as character of forage, topography, distribution of watering places, animal pests, etc., being influential. Recommendations are made for the maximum productivity of forage and the maintenance of ranges. Separate chapters are devoted to the management of cattle and sheep on ranges with especial reference to acreage quota, watering places, type of forage and salting. Other chapters discuss the reseeding of ranges, pro-

tection of watersheds, timber and game. Chronologically arranged references to related work of the Department are appended after each phase of the subject discussed.—*E. V. Hardenburg.*

1445. Kellogg, R. S. **A discussion of methods.** Amer. Forestry 25: 1282–1283. 1919. —(A contribution to the general topic "A national forest policy.") The writer believes that it is neither practical nor expedient to compel the practice of forestry upon private lands through the interstate commerce provisions of the Constitution. Several suggestions bearing on the subject of a national forest policy are made.—*Chas. H. Otis.*

1446. Kienitz, M. **Vorschläge für die Harznutzung 1919 auf Grund der Beobachtungen und Versuche in Chorin. [Suggestions for the conduct of naval stores industry in 1919, based on observation and experiments in Chorin.]** Zeitschr. Forst- u. Jagdw. 51: 6–32. 1919.—The war has stimulated the naval stores industry in Germany where formerly the greater portion of products were imported. Consequently it became necessary to exploit the pine forests of that country for stores, and experiments were started to determine the best methods of turpentining consistent with least injury to the trees but at the same time securing a maximum flow. These experiments are fully discussed and some results are stated, especially in regard to the effects of different methods of scarring on the flow of pitch.—*Hermann Krauch.*

1447. Kirkland, Burt P. **Organization of finance in forest industry.** Jour. Forestry 17: 236–244. 1919.—Much of the lumber industry is financed by borrowed capital at high interest rates. A reduction in the interest rate would save annually more than enough to secure a forest stand on all commercial cuttings and protect forests from fire, the present high interest rate being due to the speculative reputation of the industry, the high cost of loans and small borrowers. A Federal Forest Loan Board similar to the farm-loan institution would enable the industry to become better organized. The organization, functions, rates and loan restrictions of such a board are discussed in detail.—*E. N. Munns.*

1448. Kitts, J. A. **Forest destruction prevented by control of surface fires.** Amer. Forestry 25: 1264, 1306. 1919.—Forest fires are of three types—surface fires which spread over the surface of the forest floor, fed by the litter; ground fires which smolder in the ground, consuming the humus and sometimes the roots of trees; and crown fires which destroy the entire forest cover. A method of prevention of crown fires, practiced during 28 years by the writer in California, is suggested as a solution of the fire problem in the coniferous forests. The method consists in the burning of the forest litter by surface fire control, during and at the end of the wet season, burning over by rotation one-fiftieth to one-fifth of the forest area each year, the periodical rotation depending upon the local rate of litter accumulation. Eleven rules for surface fire control are detailed.—*Chas. H. Otis.*

1449. Lane-Poole, C. E. **The kiln drying of jarrah.** Western Australia Woods and Forests Dept. Bull. 1. *28 p., 12 fig., 1 chart.* 1919.—This paper gives a short description of the process employed in kiln-drying jarrah (*Eucalyptus marginata*) on scientific principles. In choosing a kiln with which to experiment the author was led to select the kiln invented by Tiemann because of the latter's success in drying California blue gum (*Eucalyptus globulus*), a very difficult lumber to season. The construction and operation of the Tiemann kiln is described. A psychrometric chart designed to give the relative humidity for any temperature at a given dew point, is appended. In the experimental runs the kiln gave very encouraging results. The author suggests that it may be possible to shorten the period of drying by inserting a fan or blower between the baffles and the radiators with a view to increasing the air circulation.—*C. F. Korstian.*

1450. Lane-Poole, C. E. **Report of the Woods and Forests Department for the half-year ended 30th of June, 1918.** Semi-Ann. Progress Rept. Woods and Forests Dept. Western Australia. *17 p.* 1919.—The work of the Department for the period considered is briefly summarized under the following captions: "Classification of forests, Reservations, Forest work,

Legislation, Forest ranging and timber inspecting, Plantation and nursery work, Forest apprentices, the Timber industry, Firewood permits, Shipbuilding, Revenue and expenditure, Botanical, Tanbarks, Sandalwood and sandalwood oil." In the jarrah country in the Southwest Division, the area of virgin forest was found to be exceedingly small. During the war the timber industry was very much depressed due to the shortage of ships. The report is appended by detailed tabulations of revenue and expenditure, timber and timber industry statistics, a list of herbarium specimens collected and identified and a list of trees planted at the Hamel State Nursery during the 6-month period.—*C. F. Korstian.*

1451. Leavitt, Clyde. **Some aspects of silvical research as an after-the-war activity.** Jour. Forestry 17: 273–280. 1919.—A plea is made for greatly increased silvical investigative work in the East, as the U. S. A. Government has established forest experiment stations in the West and none in the East. This work is not possible at present but needs federal aid to the states, so that educational centers and state foresters may be able to do intensive work.—*E. N. Munns.*

1452. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. June, 1919.—Method for comparing net photosynthetic activity of different varieties under same conditions, or of same variety under different conditions. [See Bot. Absts. 3, Entries 2685, 2833; 4, Entry 246.]—*B. E. Livingston.*

1453. Lovejoy, P. S. **Review of lumber industry affairs.** Jour. Forestry 17: 245–259. 1919.—Articles appearing in the lumber trade journals during the last half of 1918 are made the subject of a discussion on the trend of thought regarding conditions in the lumber industry. Such topics as the government and the industry, export, census, accounting, and profiteering, are included.—*E. N. Munns.*

1454. MacCaughey, Vaughan. **The mangrove.** Amer. Bot. 25: 42. 1919.

1455. Martin, Dr. H. **Die Erhaltung der Buche in Sachsen, inbesondere in gemischten Beständen. [Conservation of beech forests in Saxony, with especial reference to mixed stands.]** Tharandter Forst. Jahrb. 70: 1–32. 1919.—The advantages of mixed stands are discussed in detail with reference to the relatively high rôle which beech plays in the improvement of the physical factors of site and quality of stand. A plea is made to encourage the conservation of beech forests and the growing of this tree in mixed stands is especially advised. In the current number of the above mentioned periodical the regeneration of beech in pure stands is discussed in accordance with the results of different methods of cutting. Consideration of the regeneration of mixed stands follows in the next number of the journal.—*Hermann Krauch.*

1456. Matthews, D. W. **Tropical reconnaissance with special reference to work in the Philippines and British North Borneo.** Jour. Forestry 17: 371–377. 1919.—Tropical countries have not usually considered their forests as a whole, but have estimated only the amount of timber of certain special use and value. It is estimated that the stand in Borneo averages 1803 cubic feet per acre and in the Philippines 2389 cubic feet. How much the tropics will yield is problematical, though this should be able to tide over the timber supply until the temperate regions become more self-sustaining.—*E. N. Munns.*

1457. Maxwell, Hu. **The uses of wood. Wood used in the cooperage industry.** Amer. Forestry 25: 1208–1216. *19 fig.* 1919.—Two kinds of cooperage are employed, "tight," intended for liquids, and "slack," for dry articles. Red gum leads all other woods for staves in slack cooperage, with pine, beech, elm, maple and other woods following in the order named. For heading, pine is consumed in twice the amount of any other wood, and beech stands second, with red gum third. Elm is chiefly used for hoops. White oak is the best "tight"-cooperage wood; the pores or vessels are plugged by tyloses. The waste of wood in the manufacture of "tight" staves in the past has been very great, but utilization now is closer, and material which would have been thrown away formerly is now converted into other products. —*Chas. H. Otis.*

1458. McCarthy, E. F. **Observations on unburned cut-over lands in the Adirondacks.** Jour. Forestry 17: 386–397. *Fig. 1–2.* 1919.—Logging methods must insure the destruction of hardwoods to insure a stand of spruce as the diameter limit favors the hardwoods through cleaning up the forest and reducing the fire risk, while the heavy cutting of hardwoods increases the fire risk through slash accumulations and encourages hardwood reproduction. In the latter method softwood trees mature more quickly than in the diameter limit method, but the slow growth and late recovery of spruce necessitate subsequent cuttings of hardwoods before the spruce will make a free growth. Hardwoods can be produced in this type of excellent quality in a short time in spite of the desire to commit it to a pure coniferous forest. —*E. N. Munns.*

1459. Mellstrom, Gösta. **Skogsträdens frösättning år 1918. [See production of forest trees in 1918.]** Meddel. Statens Skogsförsöksanst. 16: 1–26. *4 fig.* 1919.—The article gives a survey of the seed crop of the more important forest trees in Sweden in 1918, and a statement of the amounts available for reforestation. The supplies throughout the country are below normal, due partly to deficient production and partly to the scarcity of labor for collection.—*G. A. Pearson.*

1460. Munns, Edw. N. **Control of flood water in southern California.** Jour. Forestry 17: 423–429. *1 fig.* 1919.—Flood control work in the United States on a definite scale began in the San Gabriel Mountains with the installation of check dams. The influence of these on the run-off during a subsequent flood period is described in detail.—*E. N. Munns.*

1461. Neger, F. W., and G. Büttner. **Der forstbotanische Garten (Forstgarten) zu Tharandt. [The Tharandt Arboretum.]** Tharandter Forst. Jahrb. 70: 33–71. *5 pl.* 1919.—A brief description of location and size, and of soil and climatic conditions, is given, together with statement of purpose of arboretum. A list of the principal trees and shrubs is cited. This arboretum is now over 100 years old and contains many fine trees, among them being a number of exotics.—*Hermann Krauch.*

1462. Olmsted, Frederick E. **The work ahead.** Jour. Forestry 17: 227–235. 1919.—Two tasks confront the forester at the present time due to a lack of understanding on the part of the lumberman as to their relationship to national welfare: (1) to compel the private owner of forest lands to keep his soils productive; (2) to decide whether timber lands should be in private or public ownership, and how they should be managed and controlled.—*E. N. Munns.*

1463. Peters, J. G. **A program of forest conservation for the south.** Jour. Forestry 17: 364–370. 1919.—Little can be done to induce the southern states to grow timber unless definite figures can be given them. Coöperation between the states and the government is necessary in the classification of lands, the acquisition of cut-over and waste lands, coöperation with private owners and in research work.—*E. N. Munns.*

1464. Ridsdale, P. S. **War's destruction of British forests.** Amer. Forestry 25: 1027–1040. *16 fig.* 1919.—A letter written in London, Feb. 8, 1919, discussing the cutting of British forests for wartime needs, reafforestation and future forest activity, together with a brief history of British forests.—*Chas. H. Otis.*

1465. Sparhawk, W. N. **Comment on Professor Terry's article. [Criticism of: Terry, E. W. A formula method for estimating timber.** Jour. Forestry 17: 413–421. *1 fig.* 1919. (See Bot. Absts. 3, Entry 1467.)] Jour. Forestry 17: 421–422. 1919.—A method is given whereby the values of the constant can be obtained much more quickly than in the original manner.—*E. N. Munns.*

1466. Stuart, R. Y. **Scouting for timber in the eastern Pyrenees.** Amer. Forestry 25: 1193–1198. *5 fig.* 1919.—Notes on the trees and stands and French logging methods in the forests in the Departments of Aude and Tarn.—*Chas. H. Otis.*

1467. Terry, E. I. **A formula method for estimating timber.** Jour. Forestry 17: 413–421. *1 fig.* 1919.—A formula is worked out to determine the volume in board feet by using the breast-high diameter, the merchantable length, the merchantable form factor and the ratio of board feet to cubic feet. Using the derived formula, a constant is determined for each diameter class which will give the board-foot volume of a tree when multiplied by the length of the tree. Plotting these values and smoothing off the curve, a volume table can readily be constructed. [See also Bot. Absts. 3, Entry 1465.]—*E. N. Munns.*

1468. Toumey, J. W. **Need for a unified forest research program.** Jour. Forestry 17: 281–289. 1919.—Research in forest problems in the United States has been left largely to the Forest Service which is primarily an administrative organization. A unification and coordination of forest research in the various educational centers is needed and an experiment station should be established, with government aid, in each state.—*E. N. Munns.*

1469. Wirt, G. H. **Pennsylvania's opinion.** Amer. Forestry 25: 1283–1284. 1919.—(A contribution to the general topic "A national forest policy.") The writer believes that the most essential factor in the national program must be educational work. Other suggestions are made as to secondary provisions.—*Chas. H. Otis.*

GENETICS

George H. Shull, *Editor*

1470. Anonymous. **Inheritance studies with poultry at the Rhode Island Experiment Station.** Rhode Island State College Bull. 13: 41–42. 1918.—Part of the Director's Annual Report, covering progress of the work under way.—*H. D. Goodale.*

1471. Coe, H. S. **Origin of the Georgia and Alabama varieties of velvet bean.** Jour. Amer. Soc. Agron. 10: 175–179. *2 fig.* 1918.—The Florida velvet bean (*Stizolobium Deeringianum*) requires a frost-free season of 8–9 months. In 1906 some early-maturing velvet beans were found in Summer, Georgia, growing from seeds which had been raised there. The plants were small, and ripened their first pods three months or more after sowing. They gave constant early progeny. In 1908 a similar mutant was observed at Broxton, Georgia; this time from Florida-grown seed. A different mutant was found at Flomaton, Alabama. In 1911 one plant in a field of Florida-grown seeds was seen to flower and mature earlier. Its progeny were constant, ripening in six months or less, and were larger than the Georgia mutant. In consequence of the discovery of these early varieties, the area under velvet beans has increased, in the past three years, from less than one million, to more than three million acres.—*John Belling.*

1472. Collins, G. N. **Structure of the maize ear as indicated in Zea-Euchlaena hybrids.** Jour. Agric. Res. 17: 127–135. *Pl. 16–18, 1 fig.* June 16, 1919.—Second and subsequent generations of *Zea-Euchlaena* hybrids grade back to the parental types and form a complete series of intermediates. In analysing the hybrids it was found necessary to consider as a morphological unit the association represented by a paired sessile and pedicelled spikelet as they occur in the staminate inflorescence. This unit has been designated "alicole."—With respect to the pistillate inflorescence all stages are found between the simple spike of *Euchlaena* and the many-rowed ear of maize. In none of these intermediates is there found anything which could serve as support for either the fasciation or "reduced branch" methods of forming a many-rowed spike but on the contrary a third method is clearly indicated. This is by a shortening and twisting of the rachis of a single spike of *Euchlaena* accompanied by an increase in the number of alicoles. Further support for this method is found on ears of pure maize which reduce the number of rows in passing from the base to the tip. In these cases the loss is almost invariably two rows and both are lost at the same distance from the butt of the ear, leaving no region with an odd number of rows. Although two rows are dropped at once they are not adjacent but are nearly on opposite sides of the ear. This is what should

occur if the two-pedicelled spikelets were dropped simultaneously from a pair of yoked alicoles and accords with the hypothesis that the ear of maize is the result of the twisting of a simple four-rowed branch.—While the evidence of *Zea-Euchlaena* hybrids seems to require the hypothesis suggested, there are facts of other kinds which are more easily interpreted by the theories of fasciation and reduction of branches and still others which do not seem to accord with any of the theories yet proposed. The author concludes that until the apparently contradictory evidence can be reconciled it is best to keep the several possibilities in mind and await additional evidence before attempting a complete interpretation. [See Bot. Absts. 3, Entry 2421.]—*J. H. Kempton.*

1473. Dahlgren, K. V. Ossian. **Erblichkeitsversuche mit einer dekandrischen Capsella bursa-pastoris (L.). [Genetical investigations with a decandrous Capsella bursa-pastoris (L.).]** Svensk Bot. Tidsskr. 13: 48–60. *2 fig.* 1919.—Detailed history of the occurrence of apetalous forms of *Capsella* and recognition of fact that these are not homogeneous. Two types of apetaly are recognized, (a) in which petals are replaced by stamens (decandrous), and (b) in which petals simply fail (hexandrous). Genetical experiments were conducted with the former type, in crosses with two of Almquist's elementary species, *Capsella collina* and *C. emarginata,* and also with *C. Heegeri* and *C. grandiflora.* With *C. grandiflora* numerous attempts failed to produce hybrids, except in one case in which a sterile plant was produced which was probably such hybrid. In crosses with the other three forms, the F_1 generation was intermediate, but not always easily distinguishable in the F_2 from the apetalous type. When these intermediates are counted with the apetalous plants, the 3 : 1 F_2 ratio is closely approximated. Totals are 106 : 40, 44 : 16, 746 : 298, 1208 : 443; grand total, 2104 : 797. The cross with *C. Heegeri* gave 394 with triangular capsules to 17 top-shaped, thus indicating the presence of two genes for the triangular form, and the usual deficiency of the recessive *Heegeri* type. Author cites further evidence that this deficiency is due to relative weakness of the *Heegeri* type. [See Bot. Absts. 3, Entry 616.]—*Geo. H. Shull.*

1474. Dehaut, E. G. **Développement en sens inverse de la coloration verte, chez Lacerta muralis tiliguerta et L. mur. quadrilineata. [Development of green coloration in reverse direction in Lacerta muralis tiliguerta and L. mur. quadrilineata.]** Compt. Rend. Soc. Biol. 82: 514–515. May 17, 1919.—Fundamental dark color of young, probably primitive, gives way in variable degree to green, which extends from behind forward in *quadrilineata* and in reverse direction in *titiquerta.* Green color has probably been developed independently in different forms under influence of natural selection.—*P. W. Whiting.*

1475. Dehaut, E. G. **Interversion d'un caractère cranien dans certaines races du Sus scrofa. [Interversion of a cranial character in certain races of Sus scrofa.]** Compt. Rend. Soc. Biol. France 82: 515–516. May 17, 1919.—Wild *Sus scrofa* and domestic continental swine do not belong to different species, although angle made by plane of occiput and frontals is acute in former and obtuse in latter. All gradations between these two forms are seen in the Corsican and Sardinian swine.—*J. A. Detlefsen.*

1476. de Vries, Hugo. **Über erbliche Ursache eines frühzeitigen Todes. [On hereditary causes of early death.]** Die Naturwiss. 7: 217–222. 1919.—A list is given of plants commonly producing seeds which develop into yellowish or etiolated seedlings (6 to 30 per cent) which soon die. Author seeks the cause of the development of such seedlings in a mutation characterized by the loss of the factor which has to do with the production of normal green coloring in the seedling. There may be a number of other factors the loss of which by mutation also causes an early death of the seedling. These lethal factors follow in hybridization typical Mendelian ratios as pointed out for *Linaria vulgaris* as well as for several species of *Oenothera.* Two interesting mutants, *Oenothera Lamarkiana* mut. *simplex* and mut. *velutina* are noted where the lethal factors (there seem to be two in these cases) which cause normally 50 per cent sterile seed, are suddenly lost and all the seed produce viable seedlings.—*Orton L. Clark.*

1477. de Vries, Hugo. **Das Wandern der Pflanzen. [The migration of plants.]** Die Naturwiss. 7: 81–89. 1919.—See Bot. Absts. 4, Entry 324.

1478. Dorsey, M. J. **Relation of weather to fruitfulness in the plum.** Jour. Agric. Res. 17: 103–126. *Pl. 13–15, 1 fig.* June 16, 1919.—A summary of evidence bearing on the influence of weather on pollination and fertilization in the plum. Conclusions are based on studies of others and on personal investigations. Observations of field conditions in Minnesota, from 1912–1918 inclusive, are supplemented by greenhouse experiments and by cytological studies.—Rain and low temperatures during periods of bloom are the most important factors of weather. Rain prevents or delays dehiscence of anthers and interferes with activity of insects. But anthers that have already opened will close under influence of rain without much loss of pollen, and pollen is not seriously injured by rain as has been very generally believed. The washing of pollen from stigmatic surfaces by rain is not an important factor. Prolonged periods of rain reduce fruitfulness chiefly by interfering with and delaying the proper dissemination of pollen.—Periods of low temperature ranging from 40° to 51° decidedly retard growth of pollen tubes and thus vitally influence fertilization. Pistils are receptive from 4 to 6 days, abscission of styles occurs from 8 to 12 days after flowers open, and pollen tubes normally make slow growth. Conditions which retard growth of pollen tubes therefore render fertilization uncertain. The severe effects of frosts are only occasional in Minnesota.—Wind pollination is found to be insufficient. Strong winds at critical times affect fruitfulness by interfering with activities of insects.—"Each season certain sets of conditions can be singled out as being largely responsible for the status of the setting of fruit," but practical means of controlling rain, temperature, and wind "under orchard conditions do not appear readily available." The author concludes that "since tube growth seems to be the process most directly affected by low temperatures, remedial measures can most effectively be sought in suitable pollinizers which show the fastest tube growth." [See Bot. Absts. 3, Entry 1529.] —*A. B. Stout.*

1479. Faure, Ch. **Note sur un cas d'hermaphroditisme rudimentaire chez le coq.** [Note on a case of rudimentary hermaphroditism in the cock.] Compt. Rend. Soc. Biol. France **82**: 519–520. May 17, 1919.—Brief description of a bird regarded by the author as an instance of false hermaphroditism in the domestic fowl.—*H. D. Goodale.*

1480. Frets, G. P. [Rev. of: Schallmayer, W. **Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst.** (Heredity and selection, fundamentals of social biology and science of race improvement.) *3rd ed., 8vo., xvi + 536 p.* Gustav Fischer: Jena, 1918. (See Bot. Absts. 2, Entry 704.) Genetica **1**: 492–495. Sept., 1919.

1481. Goedewaagen, M. A. J. [Rev. of: Davis, B M. **Some inter- and back-crosses of F_1 Oenothera hybrids.** Genetics **2**: 155–185. 1917.] Genetica **1**: 466–468. Sept., 1919.

1482. Haecker, V. [Rev. of: (1) Trübenbach, P. **Plymouths in Wort und Bild.** (Plymouth Rocks in description and illustration.) Geflügelwelt (Chemnitz) *96 p., 50 fig.* 1913. (2) Idem. **Weisse Wyandottes, ihre Zucht und Pflege.** (White Wyandottes, their breeding and care.) *Ibid. 100 p., 2 pl., 107 fig.* 1915.] Zeitschr. indukt. Abstamm. Vererb. **20**: 160–173. *13 fig.* Jan., 1919.

1483. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. **6**: 273–300. 1919. —See Bot. Absts. 3, Entry 2133.

1484. Ikeno, S. **Idengaku de iwayuru "korosu" Gen ni tuite.** [On the so-called "lethal" factor in genetics.] (Japanese.) Rigakukwai [Scientific World] **16**: 881–886. 1919.—A popular paper concerning lethal and semi-lethal factors. Illustrations are given both from vegetable and animal kingdoms. [See Bot. Absts 3, Entries 1934, 2133.]—*S. Ikeno.*

1485. Jones, W. N. **On the nature of fertilization and sex.** New Phytol. **17**: 167–188. 1918.—Interpretation of sex phenomena in both animals and plants by postulating the existence of two sets of sex agents: (1) those determining the sex of the individual, inherited according to the ordinary Mendelian scheme (the sex chromosome or factors). These may be

carried indifferently by either sperm or egg and therefore can not be the same as (2) the agents determining the type of the gametes themselves, as seen particularly in hermaphroditic species. The egg and sperm are considered to be composed of either "active," androplasmic or "passive" gynoplasmic protoplasm. The union of these substances at fertilization is considered as a form of parasitism and their continuation in the zygote as a symbiosis. Before gamete formation occurs separation of these two substances takes place in such a way that certain gametes (the eggs) are predominatingly gynoplasmic while others (the sperms) are androplasmic. This separation of the two different kinds of protoplasm is not the same as the segregation of the sex factors or sex chromosomes. Each kind of protoplasm may retain the potentiality of the other so that apogamously developed eggs may therefore still possess the capability of producing the other type of zygote.—*D. F. Jones.*

1486. Kooiman, H. N. [Rev. of: Lotsy, J. P. **Mutatie of kruising de oorzaak der evolutie? [Mutations from crossing the cause of evolution?]** Nederland. Tijdschr. Geneeskunde **17:** 1395–1404. 1918. (See Bot. Absts. 4, Entry 652.) Genetica **1:** 484–485. Sept., 1919.

1487. Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato (Lycopersicum esculentum).** Oregon Agric. Exp. Sta. Bull. 149. *90 p. 22 fig.* 1918.—The chemical and physical requirements of tomato plant, particularly with respect to available nitrogen and moisture supply and opportunity for carbohydrate synthesis, are closely associated with its ability to set and mature fruit; hence heredity, as expressed in yield, may not always be the limiting factor in productiveness. With our present knowledge of the subject, both environmental and hereditary factors must be considered in attempting to explain reproduction or vegetative behavior of plants. [See Bot. Absts. 1, Entry 1402.]—*C. E. Myers.*

1488. Kuiper, K. [Rev. of: Punnett, R. C., and the late Major P. G. Bailey. **Genetic studies in poultry. I. Inheritance of leg-feathering.** Jour. Genetics 7: 203–213. May, 1918. (See Bot. Absts. 1, Entry 492.)] Genetica **1:** 491–492. Sept., 1919.

1489. Lillie, Frank R. **Tandler and Keller on the free-martin.** Science 50: 183–184. August 22, 1919.—Author calls attention to a paper by Tandler and Keller (Deutsche tierärztl. Wochenschr. 19: 148–149. 1911) in which evidence was presented, indicating that a heifer calf, twin with a male, is malformed and sterile whenever there is anastomosis of her blood vessels with those of the male twin in the fused chorions. In one case out of seventeen there was no macroscopic vascular anastomosis and only in this case was the female twin normal. It is noted that the conclusions are the same, as far as they go, as those reached wholly independently by author (Jour. Exp. Zoöl. 23: 371–452. 1917).—*Sewall Wright.*

1490. Lotsy, J. P. [Rev. of: Bateson, W. **Root-cuttings, chimaeras and "sports."** Jour. Genetics 6: 75–80. *1 pl.* Dec., 1916.] Genetica **1:** 457–458. Sept., 1919.

1491. Lotsy, J. P. [Rev. of: Kooiman, H. N. **Over de beteekenis van het kruisen van individuen, behoorend tot verschillende Linnésche soorten, voor het ontstaan onzer huisdieren. [On the significance of crossing of individuals belonging to different Linnean species, for the origin of our domestic animals.]** Ardea 7: 108–114. 1918. (See Bot. Absts. 4, Entry 636.) Genetica **1:** 475–478. Sept., 1919.

1492. Lotsy, J. P. [Rev. of: Lehmann, E. **Ueber reziproke Bastarde zwischen Epilobium roseum und parviflorum. (On reciprocal hybrids between Epilobium roseum and E. parviflorum.)** Zeitschr. Bot. 10: 497–511. 1918. (See Bot. Absts. 3, Entry 266.)] Genetica **1:** 478. Sept., 1919.

1493. Lotsy, J. P. [Rev. of: Morgan, T. H., A. H. Sturtevant, H. J. Muller, and C. B. Bridges. **The mechanism of Mendelian heredity.** *262 p., 64 fig.* H. Holt and Co.: New York, 1915.] Genetica **1:** 486–491. Sept., 1919.

1494. Matouschek. [Rev. of: Correns, C. Fortsetzung der Versuche zur experimentellen Verschiebung des Geschlechtsverhältnisses. (Continuation of the attempt to experimentally shift the sex ratio.) Sitz.-Ber. Preuss. Akad. Wiss. Berlin 1918: 1175–1918.] Zentralbl. Physiol. 34: 18–19. 1919.

1495. Matouschek. [Rev. of: Raunkiaer, C. Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. [On the concept of elementary species in the light of modern genetical investigations.] Zeitschr. indukt. Abstamm. Vererb. 19: 225–240. *2 fig.* 1918. (See Bot. Absts. 2, Entry 41.)] Zentralbl. Physiol. 34: 71. 1919.

1496. Meyer, A. W. The occurrence of superfoetation. Jour. Amer. Med. Assoc. 72: 769–774. 1919.—Cases cited in women in which one embryo of twin pregnancy dies, but surviving embryo may continue to grow for some time. Thus differences in size and development between the two embryos has frequently led to erroneous conclusions of superfoetation. Author suggests that similar cases in other forms (cat, cow, rat) may have been incorrectly called superfoetation.—*J. A. Detlefsen.*

1497. Moore, Carl R. On the physiological properties of the gonads as controllers of somatic and psychical characteristics. I. The rat. Jour. Exp. Zoöl. 28: 137–160. *5 fig.* May 20, 1919.—Author has repeated Steinach's experiments on the heterosexual transplantation of the gonads in rats. He confirms Steinach's conclusions that spayed females into which testes have been transplanted, exhibit, when mature, the sexual instincts of the male. Likewise, castrated males into which an ovary has been grafted, exhibit the sexual and parental instincts of the female. Other secondary sexual differences, such as differences in body weight, length and size of skeleton, condition of pelage, and fat deposition, are too variable to warrant their use as indicators of a specific response to the influence of the gonads and hence Steinach's conclusions in respect to these characters are not confirmed. The transplanted ovaries are nearly normal and may ovulate. The transplanted testes consist mainly of interstitial cells, with scattered tubules lacking spermatocytes or spermatozoa.—*H. D. Goodale.*

1498. Moore, Carl R. On the physiological properties of the gonads as controllers of somatic and psychical characteristics. II. Growth of gonadectomized male and female rats. Jour. Exp. Zoöl. 29: 459–467. *1 fig.* July 5, 1919.—A comparison of the growth curve of gonadectomized males with that of gonadectomized females, shows that the former is at the higher level, though the latter curve is higher than that for intact females.—*H. D. Goodale.*

1499. Nohara, S. Sô, sonohoka Nikun no Daikon no hi-Mendel-sei Iden ni tuite [On the non-Mendelian inheritance of Raphanus sativa by Sô and two other authors.] [In Japanese]. Bot. Mag. Tôkyô 33 (Japanese part): 141–144. 1919.—Author thinks that the so-called non-Mendelian inheritance of Sô, Imai and Terasawa in *Raphanus sativa* (Bot. Absts. 2, Entry 956) might well be Mendelian, and that the non-existence of homozygous red forms might be explainable on the basis of the presence of a lethal factor.—*S. Ikeno.*

1500. Reimers, J. H. W. Th. De studie der afstammingen, der bloedlynen en de karakteristiek van onze rundveerassen. [Study of the origin, the bloodlines and the characteristics of our races of cattle.] Cultura 30: 328–353. 1918.—Writer presents his method of study of descendance and of bloodlines, aiming to find characteristics of the different families constituting our races of cattle. He gives as examples, the characteristics that are used in systems of cattle-judging, the measurements of different parts of the body, production of milk, and fat-content of the milk. These characteristics are studied relative to three well-known bulls which are kept for breeding in the Dutch province of Friesland and they show very well the usefulness of the writer's method.—*M. J. Sirks.*

1501. Schaffner, John H. The nature of the dioecious condition in Morus alba and Salix amygdaloides. Ohio Jour. Sci. 19: 409–416. 1919.—See Bot. Absts. 3, Entry 1575.

1502. Schaffner, John H. **Complete reversal of sex in hemp.** Science **50**: 311–312. Sept. 26, 1919.—Hemp grown in winter in greenhouse matures very early, never more than a few inches high. The plants are decidedly dimorphic, carpelled and staminate. The two types are briefly described. Some staminate plants later produce intermediate structures, part ovulary and part stamen. These intermediate plants usually become purely staminate toward the end of the season. Carpelled plants are usually purely carpellate at first but may later develop stamens in some flowers. Most of the carpellate plants show this reversal of sex only on attaining advanced age. There is much variation in the age at which the change is produced, and in the degree of perfection of stamens and anthers. In one plot over 50 per cent of the plants that produced only female characters at first were finally producing only typical male characters. "Female heredity is at first active and male heredity latent, and finally male heredity is active and female heredity is latent."—*Geo. H. Shull.*

1503. Schaffner, John H. **Unusual dichotomous branching in Vernonia.** Ohio Jour. Sci. **19**: 487–490. 1919.—See Bot. Absts. 3, Entry 1574.

1504. Schultz, Walther. **Versteckte Erbfaktoren der Albinos für Färbung beim Russenkaninchen im Soma dargestellt und rein somatisch zur Wirkung gebracht. [Hereditary color factors hidden in albino Russian hares, demonstrated in the soma, and purely somatically activated.]** Zeitschr. indukt. Abstamm. Vererb. **20**: 27–40. *9 fig.* Sept., 1918.—Hybridization has demonstrated that Himalayan (Russian) albino and true albinos may carry latent and transmit all the color and pattern factors which a colored rabbit carries, except the color factor itself. Existence of these latent factors in some may be directly demonstrated by experiment. In Himalayan, factors for self color and black appear activated when any part of the body is depilated and new hair is grown subject to the external stimuli, temperature and heat. Black hair may be grown even on belly (protected region difficult to influence) by depilating and keeping animal in light room at approximately freezing temperature. Depilated areas in colored rabbits and true albinos regenerate colored and white hair respectively, but in the Himalayan such depilated areas grow black hair except at the border of this depilated area where border hairs protect bare skin. When Himalayan was kept very warm, the entire depilated area regenerated only white hair. Author believes this demonstrates difference between C, color factor, and C_1, factor for Himalayan condition, and c the factor for complete albinism.—In true albino, various latent colors and color patterns were similarly activated. New characters such as dapple, zebra-like markings, and heel-spot appeared. Author believes these new characters predict possibility of germinal mutation in same direction at some future time.—*J. A. Detlefsen.*

1505. Seiler, J. **Researches on the sex-chromosomes of Psychidae (Lepidoptera).** Biol. Bull. **36**: 399–404. *1 pl., 1 fig.* June, 1919.—In *Talæporia tubulosa* Retz., first oöcyte division shows 30 chromosomes, one of which fails to divide. Daughter plates show 29 or 30 chromosomes. In 134 cases the odd element passed outward, in 89, inward. This gives an expectation of 1.5 females to 1 male. First and second spermatocyte divisions show 30 chromosomes. 30 embryos showed 59 chromosomes and 25 showed 60. Sex ratio as determined by chromosome counts from embryos from Tornow material exactly agreed with distribution of X element. Four embryos, possibly parthenogenetic, showed 58 chromosomes and two divisions of first oöcyte showed 29 passing to each pole. *Fumea casta* Pall. has 31 chromosomes in first oöcyte. Daughter plates show 31 or 30 chromosomes. Embryos have 61 or 62.—*B. Wolf, Jr.*

1506. Siemens, H. W. [Rev. of: Pribram, Dr. Hugo. **Über die Vererbung der diabetischen Konstitution. (On the inheritance of the diabetic constitution.)** Zentralbl. innere Med. **36**: 1915.] Zeitschr. indukt. Abstamm. Vererb. **20**: 158. Jan., 1919.

1507. Siemens, H. W. [Rev. of: Rüdin, Prof. Dr. Ernst. **Studien über Vererbung und Entstehung geistiger Störungen. I. Zur Vererbung und Neuentstehung der Dementia praecox. (Studies on inheritance and origin of mental disturbances. I. On the inheritance and new origin of dementia praecox.)** *vi + 172 p.* Julius Springer: Berlin, 1916.] Zeitschr. indukt. Abstamm. Vererb. **20**: 157–158. Jan., 1919.

1508. Siemens, H. W. [Rev. of: Wegelin, Prof. Carl. **Über eine erbliche Missbildung des kleinen Fingers. (On an hereditary abnormality of the little finger.)** Berliner Klin. Wochensch. 54: 1917.] Zeitschr. indukt. Abstamm. Vererb. 20: 159. Jan., 1919.

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1516. Stoll, Norman, R., and A. Franklin Shull. **Sex determination in the white fly.** Genetics 4: 251–260. May, 1919.—Breeding experiments with "white fly," *Aleurodes vaporariorum*, show that virgin females yield males; mated females, both sexes. In three cases male ratio from mated females was very low, disproving theory that fertilized eggs yield males and females in equal numbers. Male offspring produced by mated females are assumed to result from parthenogenetic development of unfertilized eggs, and it is concluded that fertilized eggs yield females; unfertilized, males.—*B. Wolf, Jr.*

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1519. Tammes, T. **De veredeling van het vlas in Nederland. [Flax-breeding in Holland.]** Mededeel. Vereen. Wetensch. Teelt Nederland. 9. *19 p.* 1918.—Discusses four points relative to flax-culture and flax-breeding: (1) the measures taken in the different flax-growing countries to improve the methods of culture; (2) improvement of technical manufactures of the gathered products; (3) means of propagating flax-growing; and (4) the results thus far obtained in flax-breeding. This last-named subject is the most important in the author's paper; but the other three are also discussed in a most interesting manner. The perpetual propaganda, made by the governments in the different countries, did not yield any result; flax-diseases and other circumstances, (as the renewed import of cotton after finishing the American Civil War (1865) were fatal to the flax-culture in many countries (especially in the Dutch province of Groningen).—The scientific method of amelioration, by breeding new and better strains of flax must save the culture; the researches necessary for this work are at present time of great importance. Great difficulties are met: flax-growers make their cultures in a manner that gives always abnormally developed and etiolated plants; these plants are much more feeble and much less resistant to diseases (flax-wilt, etc.). Flax-wilt may be controlled in two ways: (1) By chemical means, none of which are applicable in practice, and (2) by breeding new immune strains. Author has one such immune strain now in cultivation, but this strain has stems too thick and too short for satisfactory use as an economic strain. The so-called "process of degeneration" is of importance; if the grower himself harvests each year the seeds necessary for his cultures in the following year, the cultures grow steadily worse. Each three or four years newly imported Russian seed must be used for sowing to cope with this degeneration. The Russian seed is always a mixture of several types of plants that may be isolated and which give posterities with great differences in hereditable characters. Such a field of flax is not at all a homogeneous culture, but problems of manufacture make homogeneity of great importance. The process of degeneration

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tissue. In the latter case the corolla is generally closed and this may be considered as a secondary sex character associated with pure femaleness, appearing when maleness is most completely lacking. In a few cases stamens as well as pistils are sterile. So there is every step of variation in which maleness is expressed. Femaleness also varies in the degree of its expression. Classification is impossible. Conclusions: (1) Fundamentally, maleness and femaleness reside in all somatic cells of all sporophytic individuals. (2) Maleness and femaleness are quantitative differentiations, they are relative; there are all grades of intersexes and all grades of compatibilities. (3) Sex determination at least in hermaphrodites, is fundamentally a phenomenon of somatic differentiation that is ultimately associated with processes of growth, development and interaction of tissues and subject to modification or even complete determination by them.—*C. A. Gallastegui.*

1518. Swingle, Walter T., and T. Ralph Robinson. **Tangelos: What they are. The value in Florida of the Sampson and Thornton tangelos.** U. S. Dept. Agric. Bur. Plant Ind. C[rop] P[hysiology] & B[reeding] I[nvestigations] [Circular] 4. *3 p.* 1918.—Crosses between the tangerine orange and the grapefruit have been made, producing a new type of fruit named tangelos. The fruits resemble round oranges more than either of their parents and are exceedingly variable. Fruits of sister plants from seeds of a single cross-pollinated fruit are often very unlike. Second-generation seedlings resemble the F_1 plant almost as closely as though grown from a bud.—There are now two well recognized varieties of tangelos, called the Sampson and Thornton. The fruit of the Sampson variety is pear-shaped with a smooth, thin pale orange skin and an acid, soft, juicy, deep orange-colored pulp. The fruits vary in size though they are usually larger than an average orange.—The fruit of the Thornton tangelo is of a very different type having a rough thick skin with a very pale orange-colored juice. It has little acidity and resembles a good-flavored orange more than it does a grape fruit or a tangerine but resembles the tangerine in having a free rind.—The success of these two tangelos has led to the creation of hundreds of additional hybrids between tangerine oranges and grape fruit and while all of these have not been thoroughly tested there is reason to believe that some of them will prove to be resistant to the citrus canker.—*J. H. Kempton.*

1519. Tammes, T. **De veredeling van het vlas in Nederland. [Flax-breeding in Holland.]** Mededeel. Vereen. Wetensch. Teelt Nederland. 9. *19 p.* 1918.—Discusses four points relative to flax-culture and flax-breeding: (1) the measures taken in the different flax-growing countries to improve the methods of culture; (2) improvement of technical manufactures of the gathered products; (3) means of propagating flax-growing; and (4) the results thus far obtained in flax-breeding. This last-named subject is the most important in the author's paper; but the other three are also discussed in a most interesting manner. The perpetual propaganda, made by the governments in the different countries, did not yield any result; flax-diseases and other circumstances, (as the renewed import of cotton after finishing the American Civil War (1865) were fatal to the flax-culture in many countries (especially in the Dutch province of Groningen).—The scientific method of amelioration, by breeding new and better strains of flax must save the culture; the researches necessary for this work are at present time of great importance. Great difficulties are met: flax-growers make their cultures in a manner that gives always abnormally developed and etiolated plants; these plants are much more feeble and much less resistant to diseases (flax-wilt, etc.). Flax-wilt may be controlled in two ways: (1) By chemical means, none of which are applicable in practice, and (2) by breeding new immune strains. Author has one such immune strain now in cultivation, but this strain has stems too thick and too short for satisfactory use as an economic strain. The so-called "process of degeneration" is of importance; if the grower himself harvests each year the seeds necessary for his cultures in the following year, the cultures grow steadily worse. Each three or four years newly imported Russian seed must be used for sowing to cope with this degeneration. The Russian seed is always a mixture of several types of plants that may be isolated and which give posterities with great differences in hereditable characters. Such a field of flax is not at all a homogeneous culture, but problems of manufacture make homogeneity of great importance. The process of degeneration

1536. Kirk, T. W. **Control of brown-rot of some fruits. The past season's experiments.** New Zealand Jour. Agric. 18: 272–284. 1919.—See Bot. Absts. 3, Entry 1638.

1537. Lamproy, E. **Le navet en culture forcée. [Forcing turnips.]** Revue Horticole 91: 230–231. *Fig. 74–76.* Feb., 1919.—This is a growing and profitable industry. The best varieties for forcing and detailed cultural directions are given. About 2 months, from the time of sowing the seeds, are required to mature the crop. Radishes may be grown in the same frame with the turnips.—*E. J. Kraus.*

1538. Lamproy, E. **Culture des carottes de primeur. [The growing of early carrots.]** Revue Horticole 91: 219–220. *Fig. 72–73.* Jan., 1919.—There is a general discussion dealing with the selection of varieties and the making and caring for the necessary hot bed. It is suggested that radishes and lettuce be interplanted with the carrots. The seeds are sown in the latter half of January. The radishes may be removed in 4 or 5 weeks after planting, the lettuce about the middle of March, and the carrots about the end of April or the early part of May.—*E. J. Kraus.*

1539. Lamproy, E. **Culture de crambe maritime. [Culture of sea-kale.)** Revue Horticole 91: 252–254. *Fig. 82.* Mar., 1919.—The general habitat and history of sea-kale (*Crambe maritima* L.) as a pot herb are discussed. Root cuttings are most generally employed in starting new plantings, though seeds may be sown. Blanching of the new spring growths is effected either by covering the plants with earth or by inverting a flower pot over each. It is possible to force the plants in winter in the open ground by digging the soil away from the plants, placing boxes and boards over them to exclude the light and then filling the spaces with horse manure, or by means of a hot bed. More general use of this vegetable is urged.—*E. J. Kraus.*

1540. L'Esprit, A. **Acacias parisiens.** Revue Horticole 91: 280. *1 pl.* May, 1919.—Considerable error exists in the various accounts concerning the introduction of the locust tree (*Robinia Pseud-acacia*) into Europe. It is here authoritatively stated that the seeds were first secured from North America by Jean Robin in 1601, and a tree still standing in the Jardin des Plantes (Paris) was planted there in 1636 by his nephew, Vespasien Robin. A poem by M. Claro dedicated to the locust tree is included in the article.—*E. J. Kraus.*

1541. Lewis, C. I. **Some interesting phases of the pruning problem.** Better Fruit 13^8: 26–32. Feb., 1919.—This is a rather extensive review of the problems and fundamental principles underlying different pruning practices. Quotations are made at length of a recent bulletin of the Oregon Agric. Exp. Sta.: "Vegetation and Reproduction with Special Reference to the Tomato." The relation of carbohydrates and nitrates in the tree is considered as the most fundamental factor in pruning. Effects of various types of pruning upon the tree, particularly its fruitfulness, are discussed.—*A. E. Murneek.*

1542. Melander, A. L. **Why surrender to the codling moth?** Better Fruit 13^5: 33–34. Feb., 1919.—A brief popular review of steps involved in combatting the codling moth. Early, or "calyx," spraying is emphasized.—*A. E. Murneek.*

1543. Meunissier, E. **Un légume peu connu chez nous: le jet du houblon. [A vegetable little known among us; the young sprouts of the hop.]** Revue Horticole 91: 265–266. Apr., 1919.—Attention is called to the fact that the young spring shoots of the hop may be used as a delicious vegetable. The use of the hop in this way seems to be fairly well established in parts of Belgium, but is scarcely known in France. Brief cultural directions are given. Prepared according to the ordinary methods used for asparagus; hop shoots are equal to that vegetable.—*E. J. Kraus.*

1544. Mottet, S. **Neillia, Physocarpus et Stephanandra.** Revue Horticole 91: 236–238. *Fig. 77.* Feb., 1919.—The article contains a critical discussion of the synonymy, species, and forms of these genera, together with a notation as to their probable value as ornamentals. There is also a brief citation of literature referred to in the discussion.—*E. J. Kraus.*

1545. Mottet, S. **Picea omorica.** Revue Horticole 91: 269. *Fig. 86.* Apr., 1919.—This species is recommended as a valuable tree for general planting since it is highly ornamental, grows rapidly, and thrives under widely different soil and climatic conditions.—*E. J. Kraus.*

1546. Mottet, S. **Eryngium giganteum.** Revue Horticole 91: 216–217. *1 pl.* Jan., 1919.—This species is described in some detail and is recommended as being worthy of more extended cultivation as an ornamental, since it is a hardy, biennial, easily propagated by seed and its symmetrical form, and gray-green foliage produce a pleasing contrast with the surrounding plantings. If the whole plants are cut and dried by supporting them base uppermost, they may be used for purposes of interior decoration. Seeds may be obtained from leading seedsmen.—*E. J. Kraus.*

1547. Mottet, S. **Un nouveau Schizophragma (S. integrifolium). [A new Schizophragma.]** Revue Horticole 91: 275–278. *Fig. 87–88.* May, 1919.—This species is a striking ornamental. There are no sterile flowers in the infloresence, but the latter is showy because of the white, leaf-like bracts which it bears. Because of its hardiness, decidedly superior decorative qualities, and relative ease of propagation it is recommended for general planting. While somewhat similar to *Hydrangea petiolaris,* it is likely to become even more popular in its use. Several distinct varieties of the type are known.—*E. J. Kraus.*

1548. Mottet, S. **Nouveaux Viburnum de la Chine. [New Viburnums from China.]** Revue Horticole 91: 262–264. *1 pl. (colored).* Apr., 1919.—This article presents a list of some twenty species and varieties which are briefly but critically described, more especially as to their proved or potential value as ornamentals.—*E. J. Kraus.*

1549. Poisson, J. **Le Paulownia imperialis au Museum National d'Histoire Naturelle. [[Paulownia at the National Museum.]** [Paris] Revue Horticole 91: 248–250. *1 pl.* Mar., 1919.—The seeds of this species were brought to France and planted in 1835. The single seedling saved from this sowing is still alive. A reproduction from a recent photograph of it is given. The species is very readily propagated both by seeds and vegetative parts and has been widely distributed. The wood is of some commercial importance, more especially for the making of trinket boxes, ornaments, and other articles not destined for hard usage. The tree grows rapidly and is a desirable ornamental, more especially as a specimen plant.—*E. J. Kraus.*

1550. Ritzema Bos, J. **De gevolgen van een fout bij het smoeien van laanboomen. [The results of an error in pruning shade trees.]** Tijdschr. Plantenz. 24 (Bijblad): 49–51. 1918.—See Bot. Absts. 3, Entry 1655.

1551. Rolet, A. **Entretien du matériel des serres, bâches, coffres. [Preservation of greenhouse, hotbed and box materials.]** Revue Horticole 91: 266–267. Apr., 1919.—Because of the high prices and scarcity of many materials used in gardening, it is suggested that special care be taken to prevent deterioration of them. To accomplish this all equipment, etc., should be kept dry when not in use. Such chemicals as copper sulphate, iron sulphate, coal tar derivatives, and acetate of aluminium are recommended as especially valuable for the treatment of equipment made of straw or wood.—*E. J. Kraus.*

1552. Ritzema Bos, J. **Bijdrage tot de kennis van de werking der bordeauxsche pap op de aardappleplant. [A contribution to the knowledge of the action of Bordeaux mixture on the potato plant.]** Tijdschr. Plantenz. 25: 77–94. 1919.—See Bot Absts. 3, Entry 1654.

1553. Schoevers, T. A. C. **Wat nu in den boomgaard gedaan kan worden ter bestrijding van ziekten en plagen. [What may now be done in the orchard toward combatting diseases and pests.]** Tijdschr. Plantenz. 25 (Bijblad): 1–4. 1919.—See Bot. Absts. 3, Entry 1658.

1554. Taylor, A. D. **Seasons for planting ornamental plants and lawns.** Landscape Architecture **9**: 141–149. *Fig. 1–2.* 1919.—Dormant periods of plants and times for seeding lawns are discussed under the following heads: (a) deciduous trees, shrubs and vines; (b) evergreen plants (coniferous and broad-leafed); (c) herbaceous perennials; (d) lawn grasses. Reference is made to Bull. No. 10, U. S. Dept. Agric. Div. Biol. Sur., "Life Zones and Crop Zones," Part III. From data taken from this bulletin and at seventeen stations mostly in the eastern half of the United States several zones are determined based upon growing seasons. These are found to depend upon topographical and meterological conditions rather than upon lattitude and so are irregular in outline and best explained by a map (fig. 1). The planting periods for northern New England and northern Great Lakes sections include 70 to 80 days, for the great central portion of the country 100 days, for the southern which is above the tropical portions 115 to 160 days. The east and west slopes of the Rocky Mountains and west coast are not fully reported on. Data secured refers mostly to heading (a) although this is thought to apply similarly to conifers if condition of soil moisture is sufficient in ground from which they are taken and in which they are planted at time of freezing. Data for broad-leaved evergreens are reported as insufficient. The planting periods for herbaceous perennials will begin later in spring and end earlier in fall. The periods for lawn-making would in most cases be earlier, depending upon the advent of hot dry weather and the return of cooler and more moist conditions. A chart (fig. 2) gives detailed information of planting periods for woody deciduous plants and for lawn seeding at the following stations: Camden, Maine; Boston; Buffalo; Minneapolis; Toronto; Cleveland; Kansas City; Trenton, New Jersey; Cincinnati; Piedmont, Georgia; Carolina; Virginia coastal plain; Portland, Oregon; Sacramento; Jacksonville, Florida; Florida highlands; San Francisco.—*E. Gorton Davis.*

1555. Tokugawa, Yoshichika. **Kaki no dasshi ni tsuite. On the de-astringency in the fruit of Diospyros Kaki.** [Title in Japanese and English, text in Japanese.] Bot. Mag. Tôkyô **33**: 41–44. Mar., 1919.—See Bot. Absts. 3, Entry 2881.

1556. Trouard-Riolle, Y. **Radis sauvages et radis cultivés. [Wild and cultivated radishes.]** Revue Horticole **91**: 244–245. *Fig. 78–81.* Mar., 1919.—The possible origin of the radish from the charlock is discussed. The radish-like plants secured when the charlock is cultivated are in reality hybrids between that species and the radish. Several facts which indicate the accuracy of such a conclusion are: (1) If cross pollination is prevented, it is impossible to secure a transformation of the charlock in four generations. (2) If cross pollination is permitted, radish-like forms may be obtained in the first generation. (3) Such forms are intermediate in character, possess both fertile and sterile pollen grains, and produce a mixed progeny. (4) By controlled crossing radish-like progeny similar in form and behavior are obtained. (5) By preventing cross pollination the radish does not degenerate in several generations, but does so readily if permitted to cross, and in two years it is possible to recover the charlock from one hybrid seed of the radish. Once more it is recalled that it is difficult actually to trace the evolution of any form. The evolutionary hypothesis itself is called into question.—*E. J. Kraus.*

1557. Van den Heede, Ad. **Les Cuphea.** Revue Horticole **91**: 218. Jan., 1919.—A more generous planting of several species of this genus, especially *Cuphea platycentra* and *C. ignea*, is recommended. The plants are propagated either from seeds or cuttings started in the greenhouse and are transplanted to the open ground in May.—*E. J. Kraus.*

1558. Van den Heede, A. **Les conifères dans les jardins. [Conifers in gardens.]** Revue Horticole **91**: 279. May, 1919.—The fact is deprecated that conifers are generally regarded as more nearly fitted for cemetery planting than for more general use in parks and gardens. An urgent appeal is made for a more general appreciation of the common as well as the more unusual forms.—*E. J. Kraus.*

1559. Viaud-Bruant. **Nouveaux Chrysanthèmes. [New Chrysanthemums.]** Revue Horticole **91**: 213–216. *Fig. 69–71.* Jan., 1919.—The following varieties are listed and briefly described. Maud Pellet—early, bronze; Gustave Pellet—clear amber; La Paix—stocky plant, floriferous, fine rose; Maréchal Foch—large flowered, bright rose with silvery reflections; Louis Legrand—large flowered, crimson purple; Maréchal Pétain—nasturtium red, suffused with a very warm tone; Le Tigre—stocky compact plant, carmine purple, variegated white at base; La Victoire—large flower, incurved, delicate, clear rose, the backs rosy saffron, very downy; Hommage au Poilu—large flower, spreading incurved, brilliant yellow, the backs touched with rose, very downy.—*E. J. Kraus.*

1560. Viguier, R. **Les Araliacées cultivées. [Cultivated Araliaceae.]** Revue Horticole **91**: 228–229. Feb., 1919.—The following genera placed by the author in group 1, having simple leaves, are listed and characterized:—*Hedera* L; *Gilbertia* Ruiz and Pavon; *Fatsia*, Decaisne and Planchon; *Tetrapanax* C. Koch; *Echinopanax* Decaisne and Planchon; *Oreopanax* Decaisne and Planchon; *Kalopanax* Miquel; *Trevesia* Vis; *Meryta* Forster; *Pseudopanax* K. Koch. The article is to be continued. [See also next following Entry, 1561.]—*E. J. Kraus.*

1561. Viguier, R. **Les Araliacées cultivées. [Cultivated Araliaceae.]** Revue Horticole **91**: 250–252. Mar., 1919.—A continuation of a former article on the same subject (Revue Horticole **91**: 228–229. 1919). In the present paper the author presents an analytical key to the several genera and further characterizes in detail the genera of two more groups as follows: (2) Aralias with palmately compound leaves; *Schefflera* Forst; *Dizygotheca* N. E. Brown; *Tupidanthus* Hook. and Thoms; *Acanthopanax* Decaisne and Planchon; *Pseudopanax* K. Koch; *Nothopanax* miq.; *Oreopanax* Decaisne and Planchon; *Cussonia* Thunb.; *Panax* L.; (3) Aralias with pinnately compound leaves; *Polyscias* Forst; *Aralia* L.; *Delarbrea* Vieillard. [See also next preceding Entry, 1560.]—*E. J. Kraus.*

1562. Wagner, J. P. **Les conséquences de la guerre pour l'horticulture en pays neutre. [The results of the war upon horticulture in a neutral country.]** Revue Horticole **91**: 246–248. Mar., 1919.—The earlier French influences on the horticulture of Luxemburg have been largely replaced by those of German origin because of commercial and geographical limitations. A return to the former is advised and several means by which this may be achieved are suggested.—*E. J. Kraus.*

1563. Wheelwright, R. A. **Reference table of native ferns.** Landscape Architecture **9**: 129–130. *Fig. 1–2.* 1919.—Text consists merely of brief explanation of tables. Two full-page tables list fifty-two species of native ferns, of which both botanical and common names are given and also such characteristics as height, evergreen or deciduous, sun and shade requirements, soil, depth to be planted, spacing and other directions for use in landscape planting.—*E. Gorton Davis.*

HORTICULTURE-PRODUCTS

1564. Alvarez, O. P. **Descripción geográfica de la Isla de Formosa. [Descriptive geography of Formosa.]** [Chapt. III, Botany.] Bol. R. Soc. Geogr. Madrid **60**: 445–499. 1918. [Through abst. by Fragoso, R. Gz., in Bol. R. Soc. Española Hist. Nat. **19**: 288. 1919.] [See Bot. Absts. 4, Entry 312.]

1565. Bertrand, Gabriel. **Sur les conserves de fruits préparées a froid, sans addition de sucre, d'alcool ni d'antiseptique. [Preservation of fruits without heating.]** Compt. Rend. Acad. Sci. Paris **168**: 1162–1164. 1919.—An attempt was made to devise a method for the preservation of fruit without heating and without the addition of sugar or of other preservative. Fruits were washed carefully and sealed in jars in water from which air bubbles had been excluded. The jars of fruit were allowed to stand for almost a year. In certain cases alcoholic fermentation set in but after 11 months 17 cans out of a total of 45 were in perfect

condition, while in other cases only a slight fermentation had resulted. Author concludes that under certain conditions fruit may be preserved without heating and without the addition of preservatives of any sort.—*V. H. Young.*

1566. Müller, B. [Rev. of: Kleberger, Kling and Westphal. **Versuche über Trocknung von Gemüse und Obst. [The drying of vegetables and fruits.)** Mitteil. Deutsc. Landw. 1917: 619. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 252–254. 1918.—Directions for drying bean, kohlrabi, cabbage and peas are given, with initial and final temperature, length of time for drying, etc. Special directions are given for withered vegetables.—***F. M. Schertz.***

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

1567. Alvarado, Salustio. **La fina estructura de los vasos lenosos (Nota previa). [Minute structure of wood vessels.]** Bol. R. Soc. Española Hist. Nat. 19: 66–75. *Fig. 1–7.* 1919.—Author reviews the growth of knowledge of wood vessels since the time of Henshaw, Malpighi and Grew. Uses the tannin-silver method of Achúcarro-Río Hortega (see Alvaredo. Plastosomas y leucoplastos en algunas fanerogamas. Trab. Mus. Nacion. Cien. Nat. Ser. Bot., No. 13. 1918. *p. 9–14*) and prepared material of barley and iris, illustrated in *fig. 1–6*, showing wood vessels with the annular, spiral, or reticulated thickenings. Describes main wall of trachea as primary membrane, the thickenings as secondary membrane, both being about equally constituted as to cellulose and lignin. Prepared by above method the secondary membrane (annular, spiral, or reticulated thickenings) stains to show always a very dark axial line surrounded by a fairly clear sheath which in turn is surrounded by an external sheath of an intermediate darkness. In vessels with reticulations very close this structure is difficult to observe, but where meshes are wider they often clearly anastomose, as shown in fig. 4 for barley. Author notes this structure is identical in vessels from root, shoot, leaf, and ovary, and from diverse plants (*Cicer*, *Phaseolus*, *Iris*, and *Hordeum*). The three zones are thought not to differ much chemically but to be cellulose more or less condensed or modified by the mixture of other carbohydrates. Resemblance to structure of starch grains similarly prepared is exact (*fig. 7*), and the suggestion of A. Meyer that carbohydrate lamellae and starch-grain layers are alike as to structure and growth is approved by author, who propounds the question as to whether the thickenings are not greatly elongated sphero-crystals of cellulose, much as starch is concerned in the formation of the starch grain. Author notes that (1) with formation of large central vacuole and the location of the protoplasm along the wall of the cell, the protoplasm becomes more granular at point where thickenings are to occur; (2) the chondriomes (the secretory apparatus of the cell) develop considerably in exactly those large vascular cells where thickenings occur; (3) the secondary membrane is a secretion product of the protoplasm. These three phenomena are simultaneous in same cell, and are not the thickenings due to activity of mitochondria which are abundant in cell immediately before the thickenings form. Grains of starch are product of secretion of mitochondria or of their derivatives the plastids, and Dop (1914) has seen the formation of cellulose in interior of chondriosomes. Author concludes that secondary membrane does not form by local decomposition over cellulose sheath of primary membrane but rather by growth with reference to the central axis of the thickening as a central nucleus or hilum, and that the external sheath in contact with the primary membrane is the last part to be formed.—*O. E. Jennings.*

1568. De Toni, G. B. **Letture contributo alla teratologia del genera "Chrysanthemum" L. [Lecture on teratology in the genus "Chrysanthemum" L.]** Atti R. Accad. Sci. Torino 54: 254–257. 1918–1919.—Three examples of fasciation in *Chrysanthemum carinatum* Schoub. var. *luteum* are given, in which the first shows true synanthy both externally by complete union of the disk flowers surrounded by complete circle of ray flowers, and internally by complete fusion of medullary parenchyma of the head; while the other two are of different types of adhesion in peduncles and heads, showing apparent synanthy in both external and internal characteristics.—*Harriet M. Libby.*

1569. Longo, B. Richerche su la poliembrionia. [Studies on polyembryony.] Ann. Botanica [Roma] 14: 151–162. *1 fig.* Aug. 30, 1917.—Specimens of the ovaries of *Xanthoxylum alatum* Roxb. were examined and compared with the carpels and fruiting parts of X. *Bungei* Planch previously studied by the author. Statistical study of the number of cases of polyembryony occurring shows that this phenomenon is not as common as in the case of the latter plant. The study of the species of *Skimmia* resulted negatively because of the more or less complete abortion of the pistil in these plants. Vegetative regeneration of *Skimmia* sp. growing for a numbers of years, especially as to root development, was observed, though no buds appeared. The plants were found to produce seedless or aborted-seeded fruits without pollination. Rudimentary vivipary of *Skimmia* was demonstrated.—*J. A. Nieuwland.*

1570. Mascre. Nouvelles remarques sur le rôle de l'assise nourricière du pollen. [Concerning the function of the tapetum.] Compt. Rend. Acad. Sci. Paris 168: 1214–1216. 1919.—A brief description of certain features in the development of the tapetum of certain genera of the *Solanaceae* together with notes on the functions and cell content of the cells of the tapetum. The following forms were studied in more or less detail, viz., *Datura arborea* L., *D. Stramonium* L., *D. Tatula* L., *Solanum Dulcamara* L., *Atropa Belladonna* L., *Nicandra physaloides* Gaertn., and *Solanum tuberosum* L. Other genera mentioned are *Hyoscyamus, Nicotiana, Lycium, Digitalis, Anchusa* and *Symphytum.*—*V. H. Young.*

1571. Mottet, S. Pomme de terre gigogne. [A monstrous potato.] Revue Horticole 91: 255–256. *Fig. 83.* Mar., 1919.—A monstrous form of the potato in which eight small tubers are clustered at the end of a large one, is described. Two other specimens, one the form of a duck and the other the form of a hand, are cited as having been previously listed.—*E. J. Kraus.*

1572. Nakajima, Yôzô. Midzu-ohbako no kwajitsu no hôwai genshô ni tsuite. Über das Verbreitungsmittel der Samen von Ottelia alismoides Pers. [On the method of seed distribution of Ottelia alismoides Pers.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tôkyô 33: 44–52. March, 1919.—See Bot. Absts. 4, Entry 249.

1573. [Norstedt, C. T. O.] [Swedish rev. of: Harms, U. Über die Geschlechtvertheilung bei Drya octopetala L. nach Beobachtungen in Kgl. Botanischen Garten Berlin-Dahlem. (Concerning sex ratios in Drya octopetala.) Ber. Deutsch. Bot. Ges. 36: 292–300. *Fig. 6–10.* 1918.] Bot. Notiser 1918: 247. 1918.

1574. Schaffner, John H. Unusual dichotomous branching in Vernonia. Ohio Jour. Sci. 19: 487–490. 1919.—At Emporia and Meriden, Kansas, dichotomy in the stems of *Vernonia baldwinii* Torr. was found to be of wide distribution and abundant occurrence. Fasciation was relatively rare. The dichotomy is considered as a case of ever-sporting or recurrent variation.—*H. D. Hooker, Jr.*

1575. Schaffner, John H. The nature of the dioecious condition in Morus alba and Salix amygdaloides. Ohio Jour. Sci. 19: 409–416. 1919.—Of 66 *Morus alba* trees examined, 28 were found to be carpellate, 24 staminate and 14 intermediate. Detailed descriptions are given of the intermediates. One individual showed sex reversal in the vegetative tissues of the bud. It is concluded that sex reversal is probably due to a change in the physiological state of the tissues, and that this might be most readily accomplished in the zygote. Of 100 *Salix amygdaloides* trees, 9 intermediates were found, showing catkins with staminate flowers below and carpellate flowers at the tip. At the transition zone, abnormal flowers were frequent. Sexuality is considered to be quantitative; not a Mendelian character but a physiological condition. The life cycle of *Selaginella kraussiana* is cited in substantiation.—*H. D. Hooker, Jr.*

1576. Simbo, Ippo. Hompo-san nisan no chûei ni kwansuru kenkyû. Beiträge zur Kenntnis einiger einheimischen Pflanzengallen im Japan. [Studies on some plant-galls in Japan.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tôkyô 33: 1–12. Jan., 1919.—See Bot. Absts. 3, Entry 2895.

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

1577. Anonymous. **A new kelp project at San Diego.** Pacific Fisherman 17^6: 58. 1919. —A note on the organization of a new company to manufacture chemicals from kelps.—*T. C. Frye.*

1578. Delsman, H. C. **The egg-cleavage of Volvox globator and its relation to the movement of the adult form and to the cleavage types of Metazoa.** Proc. Roy. Acad. Sci. Amsterdam **21**: 243–251. 1918. [Transl. from Versl. K. Akad. Wetensch. Amsterdam, 1918.]—A study of the egg-cleaves of *Volvox globator* shows that the process does not correspond to the spiral type in the form in which it occurs in Metazoa. It is suggested that the dexiotropic rotation of the *Volvox* colony results from the dexiotropic torsion of the egg cells during cleavage, the main axis of the cells undergoing a slight deviation. The torsion during egg-cleavage is regarded merely as "a very precociously appearing character of the adult form related to the movement of the latter."—*F. B. Wann.*

1579. Gloess, Paul. **Les plantes marines. Leurs utilisations. [Utilization of marine plants.]** Bull. Inst. Oceanograph. Monaco 350. *80 p.* 1919.—A statement of the present treatment of marine plants in the derivation of useful products from them, and the uses of these plants chiefly from the manufacturing and chemical points of view. The groups considered are the red and the brown algae, and *Zostera* and species related to it. About a fourth of the article is devoted to the properties, treatment and uses of algin and the alginates. —*T. C. Frye.*

1580. Groves, James. **Tolypella glomerata Leonh. in the Isle of Wight.** Jour. Botany **57**: 197. 1919.—Note on occurrence. This is apparently the first record of a species of *Tolypella* on the island.—*K. M. Wiegand.*

1581. Hirsch, Erwin. [Rev. of: Pascher, A. **Flagelaten und Rhizopoden in ihren gegenseitigen Beziehungen. Versuch einer Ableitung der Rhizopoden. (Flagellates and Rhizopods and their relations.)** Arch. Protistenk. **38**: 1–88 *Fig. 1–65.* 1917.] Naturwiss. **7**: 74–75. 1919.

1582. Sauvageau, C. **Sur la dissémination et la naturalization de quelques algues marines. [Dispersion and acclimatization of marine algae.]** Bull. Inst. Oceanograph. Monaco 342. *28 p.* 1918.—The motility of the reproductive cells is an inconsiderable factor in dispersion, in comparison with currents; the red algae are therefore not at any material disadvantage on account of their non-motile sperms and spores. Extension of range is largely by means of reproducing fragments carried by currents. Shore algae may be carried through attachment to floating supports, among which may be ships. When pieces of algae are transported to situations unsuitable for reproduction the species may maintain itself vegetatively for years.—*T. C. Frye.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

1583. Evans, Alexander W. **Noteworthy Lejeuneae from Florida.** Amer. Jour. Bot. **5**: 131–150. *Fig. 1–5.* 1918.—Six additions to the Lejeuneae of Florida, all collected by S. Rapp in the vicinity of Sanford, are recorded, the total number now known from the state being 44. The additions include *Lejeunea longifissa* Steph., previously known from Cuba, *Rectolejeunea Maxonii* Evans, previously known from Jamaica only but now known also from Alabama and Porto Rico, and the following species proposed as new: *Cololejeunea contractiloba, Lejeunea cladogyna, Euosmolejeunea parvula* and *Ptychocoleus heterophyllus.* Of these new species *Lejeunea cladogyna* occurs also in Porto Rico and *Ptychocoleus heterophyllus,*

in Honduras; the remaining two, according to our present knowledge, are confined to Florida. The peculiarities of the species noted are discussed and the new species are described in detail. In the case of *Ptychocoleus heterophyllus* vegetative reproduction by means of modified caducous leaves, borne on branches of limited growth, is reported. The figures illustrate *Lejeunea longifissa* and the 4 new species.—*Alexander W. Evans.*

1584. Fletcher, George. **Red Cross work at the Royal College of Science.** Jour. Dept. Agric. Ireland **19**: 322–326. 1919.—See Bot. Absts. 3, Entry 1671.

1585. Gertz, Otto. **Anomalier i groddknopparnes byggnad hos Lunularia cruciata L. [Anomalies in the structure of the gemmae in Lunularia cruciata.]** [Swedish with German resumé.] Bot. Notiser **1918**: 231–234. *9 fig.* 1918.—The anomalies appeared mostly as a result of supernumerary growing points. The gemmae often acquire a rounded-triangular form with three growing points, one apical and two lateral, one on each side near the base. Sometimes the apical growing point is lacking and two are present on one or both sides. In one case a gemma was divided into halves, which curved at right angles to each other; when placed in water for culture, one of the halves assumed a vertical position and formed rhizoids on both surfaces.—*P. A. Rydberg.*

1586. Pearson, Wm. Henry. **Hepatics of Denbighshire.** Naturalist **1918**: 66–67. 1918. —About a dozen species are mentioned, and notes on distribution are given in considerable detail. *Haplozia pumila* is recorded from the county for the first time.—*Alexander W. Evans.*

1587. Pearson, William Henry. **Notes on Radnorshire hepatics.** Jour. Botany **57**: 193–195. 1919.—The paper is based on a collection made by Mr. Harry Bendorf at Aberedw, in April, 1919. Forty-three species were identified, as compared with nineteen previously listed from the country. Critical notes are given on several species, and a list of novelties is included. Among the latter the following are especially noteworthy: *Lejeunea cavifolia* (Ehrh.) Lindb., var. *heterophylla* Carr., *Lophocolea spicata* Tayl. and *Riccia Crozalsii* Lev. The first of these is provisionally raised to specific rank under the name *Lejeunea heterophylla* (Carr.) Pears.—*K. M. Wiegand.*

1588. Pearson, Wm. Henry. **Hepatics of the Hebden Bridge Valley.** Naturalist **1918**: 123–124. 1918.—The results of a collecting trip made in September, 1917, are reported. Among the more interesting species found are the following: *Nardia geoscypha, Scapania umbrosa, S. curta, Lophozia atlantica* and *Jubula Hutchinsiae.*—*Alexander W. Evans.*

1589. Schiffner, V. **Hepaticae Baumgartnerianae dalmaticae. III Serie. [Baumgartner's Dalmatian Hepaticae. Third Series.]** Oesterr. Bot. Zeitschr. **67**: 147–156. *19 fig.* 1918.—The region treated—the Zaratiner—embraces the Dalmatian coast from Nona to Zaravecchia, together with the neighboring islands. The ground is for the most part low and covered over with evergreen shrubs. Twenty-seven species of Hepaticae are enumerated with citations of specimens, ten belonging to the Marchantiales and seventeen to the Jungermanniales. *Riccardia multifida* (L.) S. F. Gray is recorded for the first time from Dalmatia and the following varieties are described as new: *Riccia subbifurca* Warnst., var. *inversa* Schiffn., and *Fossombronia caespitiformis* De Not., var. *multispira* Schiffn. The figures illustrate *Riccia Henriquesii* Lev. and *R. subbifurca,* vars. *eutricha* Schiffn. and *inversa.*—*Alexander W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI

E. W. Olive, *Editor*

1590. Fragoso, R. Gz. **[Microtechnique of the Fungi.]** [Rev. of: Moreau, F. **Notions de technique microscopique.—Application à l'étude des champignons.** Bull. Soc. Mycol. France **34**: 137–191. *35 fig.* 1918.] Bol. R. Soc. Española Hist. Nat. **19**: 288. 1919.—A compendium for those beginning the study of mycology.—*O. E. Jennings.*

1591. Fragoso, Romualdo Gonzáles. La "antracnosis" o "rabia" del guisante." (Ascochyta Pisi Lib.) [Anthracnose or rabies of peas.] Bol. R. Soc. Española Hist. Nat. 19: 189–196. *Pl. 5 (colored), fig. 1–3.* 1919.—See Bot. Absts. 3, Entry 1637.

1592. Pethybridge, George H. A destructive disease of seedling trees of Thuja gigantea Nutt. Quart. Jour. Forest 13: 93–97. 1919.—See Bot. Absts. 3, Entry 1652.

1593. Taubenhaus, J. J. Pink root of onions. Science 49: 217–218. Feb., 1919.—See Bot. Absts. 3, Entry 1653.

1594. Turconi, M. Un nuovo parassita dei peperoni (Acrothecium Capsici n. sp.). [A new parasite of pepper.] Revist. Patol. Veg. 9: 131–133. 1919.—See Bot. Absts. 3, Entry 1665.

1595. van der Lek, H. A. A. Over de z. g. "verwelkingsziekten," in het bijzonder die, welke door Verticillium alboatrum veroorazzkt worden. [Regarding the so called wilt diseases, especially those caused by Verticillium alboatrum.] Tijdschr. Plantenz. 24: 205–219. *Pl. 4, fig. 1–3.* 1918. *Ibid.* 25: 17–52. *Pl. 1–2, fig. 1–4.* 1919.—See Bot. Absts. 3, Entry 1666.

1596. Wolf, F. A., and R. O. Cromwell. Clover stem rot. North Carolina Agric. Exp. Sta. Tech. Bull. 16. *18 p., Pl. 1–13.* 1919.—See Bot. Absts. 3, Entry 1669.

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

1597. Bassler, H. A sporangiophoric Lepidophyte from the Carboniferous. Bot. Gaz. 68: 73–108. *Pl. 9–11.* 1919.—Describes fructifications which were apparently those of certain species of *Lepidodendron* and shows that these depart rather widely from the well known *Lepidostrobus* type in that the sporophylls comprise stalk and blade and a large adaxial lamellar sporangiophore which bears two large radially elongated sporangia, the whole being normally shed at maturity, since in no cases is the cone axis preserved. For these sporangiophoric Lepidophytes the new genus Cantheliophorus is proposed, and since they seem to be of great stratigraphic importance, 12 species are discriminated, of which seven are new. The material comes from Maryland, Kansas, Pennsylvania, Scotland, Silesia and Spitzbergen.

Environmental and phylogenetic considerations are fully discussed and the author concludes that the simple relation of the Lycopod sporangium to the sporophyll is a reduction from sporangiophoric ancestors and that the sterile plates of several species of *Lepidostrobus* and the sterile tissue in *Spencerites* and *Mazocarpon,* while favorable to nutrition, are not developed as a result of progressive sterilization but are remnants of the sporangiophore present in the ancestral lepidophytes. The discovery of *Cantheliophorus* goes a long way to substantiate this contention and the consequent relationship between the Lepidophyta and the Sphenophyllae and Calamariae.—*E. W. Berry.*

1598. Berry, E. W. The Upper Cretaceous Mississippi Gulf. Sci. Monthly 9: 131–144. *Fig. 1–6.* 1919.—During Triassic, Jurassic and Comanchean (Lower Cretaceous) times southeastern United States was above sea. This land was the scene of the culmination and final extinction of Pteridosperms, ferns, calamites, lepidodendrons and sigillarias that had characterized the coal measures; of the differentiation of the Triassic floras; and of the expansion and wane of cycadophytes of the Jurassic and Comanchean. It witnessed the origin and differentiation of Angiosperms.—The age of mammals in Tertiary times was made possible, as was the development of man beyond the hunting stage, by the fruits and seeds of flowering plants.—The early Upper Cretaceous is a time of surpassing interest to the student of by-gone floras. The Tuscaloosa has the most extensive flora of any of the Cretaceous formations of the Mississippi embayment. It comprises over 150 species, none of which are known in the Eocene of this region. Of the 87 genera, representing 48 families

and 31 orders, over half are now extinct, while others are only found in South America, the orient or the antipodes.—The largest alliances are Ranales with 26 species, Rosales with 15 species, Sapindales with 15 species, Coniferales with 14 species and Urticales with 8 species. One hundred and twenty-three are dicotyledons, only 16 of which belong to the gamopetalous division. Among the conifers are *Sequoia*, *Dammara*, *Protodammara* and *Widdringtonites*. Figures show leaves of *Devalquea*, *Manihotites* and 4 *Bauhinias*.—*L. Page.*

1599. BERRY, EDWARD W. **Eucalyptus never present in North America.** Science 49: 91–92. Jan., 1919.—The author believes that the identification of *Eucalyptus* in many fossil floras has led to erroneous conclusions in the minds of many geologists and botanists. The theory of origin and distribution for the family Myrtaceae, advanced by him a few years ago, considered America as the center of radiation for the family, and regarded the subfamily Myrtoideae as the most ancient. The subfamily Leptospermoideae was regarded as derived from the former, and Australian types which are the peculiar ones of the family, were regarded as having originated in that region in response to local environmental conditions subsequent to the cretaceous radiation of the family stock. Genera such as *Eugenia* and *Myrcia* were regarded as representing this ancestral stock more nearly than any other of the existing genera. *Eucalyptus* was considered as one of the more specialized genera. The author does not regard the genus *Eucalyptus* as ever having been present in fossil forms in North America. He advocates the dropping altogether of the use of *Eucalyptus* for the numerous North American Cretaceous forms, and the taking up of the genus *Myrtophyllum* and using it for leaves of Myrtaceae whose generic relations cannot be determined with certainty, and more especially for the leaves commonly referred to the genus *Eucalyptus*.—*A. H. Chivers.*

1600. BERRY, E. W. **Upper Cretaceous floras of the Eastern Gulf region in Tennessee, Mississippi, Alabama and Georgia.** U. S. Geol. Surv. Prof. Paper 112. *178 p., 33 pls. 12 fig.* 1919.—A monographic account of the geology and fossil floras of the earliest Upper Cretaceous sediments of the eastern shores of the Mississippi embayment. The oldest formation recognized, namely the Tuscaloosa, contains 151 species of plants, referred to genera of which 50 per cent are extinct at the present time. Of special interest are the Coniferophyta represented by the genera *Pinus, Dammara, Sequoia, Androvettia, Protophyllocladus, Brachyphyllum, Protodammara, Geinitzia, Abietites* and *Widdringtonites*. There are 123 species of Dicotyls in the flora, 107 of these are Choripetalae and 16 Gamopetalae. New species are described in *Sphaerites, Lycopodites, Cladophlebis, Piperites, Ficus, Platanus, Cocculus, Menispermites, Capparites, Cassia, Leguminosites, Celastrophyllum, Sapindus, Grewiopsis, Oreodaphne, Malapoenna, Conocoarpites, Aralia, Sapotacites, Calycites, Carpolithus and Phyllites.*—Overlying the Tuscaloosa formation are marine beds referred to the Eutaw formation and correlated with the Turonian stage of Europe. These have furnished 41 species of plants of which the commonest is a well marked species of *Araucaria*. Still younger beds are referred to the Ripley formation which is correlated with the Emscherian stage of Europe. These beds have furnished 21 species of plants. The book is profusely illustrated and contains complete tables of distribution.—*E. W. Berry.*

1601. BERRY, E. W. **A new Matonidium from Colorado, with remarks on the distribution of the Matoniaceae.** Bull. Torrey Bot. Club 46: 285–294. *Fig. 2, pl. 12, 13.* 1919.—Fully describes and illustrates a species of *Matonidium* from the Cretaceous of southwestern Colorado. The second part of the paper discusses the former cosmopolitanism of the Matoniaceae and plots the known occurrences of both existing and fossil species on a world map.—*E. W. Berry.*

1602. BERRY, E. W. **Article Paleobotany.** Encyclopedia Americana 21: 140–170. *5 fig.* 1919.—General account of the history and present status of the science. The various plant phylae are discussed, the so-called vascular plants being segregated into the following great groups: Pteridophyta (restricted to the Filicales): Arthrophyta, comprising the modern Equisetales and the extinct Sphenophyllae and Calamariae: Lepidophyta, comprising the orders Lepododendrales, Lycopodiales, Isoetales and Psilotales: Pteridospermophyta or

seed ferns: Cycadophyta or cycads and their extinct relatives: Coniferophyta, which correspond almost precisely with the Gymnospermae of the older students: and Angiospermophyta which comprises the so-called flowering plants.—*E. W. Berry.*

1603. Berry, E. W. **Geologic history of the locust and its allies.** Plant World 21: 284–298. *26 fig.* 1919.—A popular account of the geological history and former distribution of the genera *Robinia, Gleditsia, Gymnocladus* and *Cercis* illustrated with numerous figures of fossil forms.—*E. W. Berry.*

1604. Berry, E. W. **Paleogeographic significance of the Cenozoic floras of equatorial America and the adjacent regions.** Geol. Soc. Amer. Bull. 29: 631–636. (1918) 1919.—Summarizes our knowledge of the Tertiary floras of South America and southern North America, concluding that the Mesozoic and early Tertiary radiation of the flowering plants was from the Northern Hemisphere over well defined land connections with South America, and that there was a free interchange of forms in the Oligocene, Miocene and Pleistocene.—*E. W. Berry.*

1605. Berry, E. W. **Age of certain plantbearing beds and associated, marine formations in South America.** Geol. Soc. Amer. Bull. 29: 637–648. (1918) 1919.—Summarizes existing knowledge of the Tertiary floras of Panama, Colombia, Ecuador, Peru and Chile and proposes tentative correlations of these with marine formations in this general region and also with Patagonia and Antarctica, discussing their bearing on the geological history of the western part of the continent.—*E. W. Berry.*

1606. Berry, E. W. **Miocene fossil plants from northern Peru.** Proc. U. S. Nation. Mus. 55: 279–294. *Pl. 14–17.* 1919.—Describes the geology and fossil flora found in the coastal region of northern Peru south of Tumbez. The following plants are described from beds of early Miocene, probably Burdigalian, age: *Iriartites tumbezensis* n. gen. et sp., *Stenospermation columbiense* Engelhardt, *Bambusium Stübeli* Engel., *Ficus Winslowiana* n. sp., *Guatteria culebrensis* Berry, *Amona Winslowiana* n. sp., *Banisteria incerta* n. sp., *Trigonia varians* Engel., *Vochysia retusidolia* Engel., *Tapirira lanceolata* Engel., *Mespilodaphne tumbezensis* n. sp., *Persea macrophylloides* Engel., *Styrax lanceolata* Engel., *Condaminea grandifolia* Engel. It is shown that in early Miocene times a tropical mesophytic flora occupied the present coastal desert region, from which it is concluded that the Andes had not been elevated at that time or that the Humboldt current did not occupy its present position.—*E. W. Berry.*

1607. Berry, E. W. **An Eocene flora from trans-Pecos Texas.** U. S. Geol. Surv. Prof. Paper 125: 1–9. *2 fig., pl. 1–13.* 1919.—Describes a basal Eocene flora from the Barilla Mountains in western Texas. Species described are *Sabalites grayanus* (Lesq) Berry, *Geonomites visianii* n. sp., *Juglans rugosa* Lesq., *Asimina eocenica* Lesq., *Ilex barillensis* n. sp., and *Oreodaphne pseudoguianensis* Berry.—*E. W. Berry.*

1608. Campbell, D. H. **The derivation of the flora of Hawaii.** *34 p.* Stanford Univ., California. 1919.—An extended discussion of the regional relationships of the Hawaiian flora and summary of the faunal evidence of all the great groups so far as known. The author concludes that the liverworts and filmy ferns afford especially conclusive evidence, which is supported in a greater or less degree by evidence derived from other plant groups and the fauna, that the bulk of the Hawaiian flora was derived from the South Pacific region, and that this derivation cannot be satisfactorily explained except by the assumption of a more or less direct land connection in former geologic times.—*E. W. Berry.*

1609. Carpentier, A. **Notes d'excursions paléobotaniques à Chalonnes et Montjean (Maine-et-Loire). [Notes of paleobotanical excursions to Chalonnes and Montjean.]** Compt. rend. somm. Soc. geol. France 11: 118–119. 1919.—Records *Psilophyton, Lepidodendron, Rhodea Archaeopteris, Calymmatotheca, Telangium* and *Zeilleria* from the Lower Carboniferous of France.—*E. W. Berry.*

1610. Howe, M. A. Tertiary calcareous Algae from the islands of St. Bartholomew, Antigua and Anguilla. Carnegie Inst. Washington [D. C.] Publ. 291: 9–19. *Pl. 1–6.* 1919.—Records *Lithoporella melobesioides* Foslie, a recent species of the Maldives and found fossil in New Guinea, from the upper Oligocene Anguilla formation of Anguilla, from the middle Oligocene of Antigua, and from the upper Eocene or lower Oligocene of St. Bartholomew. Describes the following new species: *Archaeolithamnium affine, Lithothamnium concretum* and *Lithophyllum ? molare* from the middle Oligocene of Antigua; and *Lithophyllum homogenium* from the upper Eocene or lower Oligocene of St. Bartholomew.—*E. W. Berry.*

1611. Kidston, R., and W. H. Lang. On Old Red Sandstone plants showing structure from the Rhynie Chert Bed, Aberdeenshire. Pt. I. Rhynia Gynne-Vaughani. Trans. Roy. Soc. Edinborough 51: 761–784. *1 pl.* 1917.—Describes morphology of the oldest land plant whose structure is at all completely known. *Rhynia* comes from a chert band in the Devonian of Scotland, the chert representing silicified beds of peat, made up almost entirely of the prostrate stems and rhizomes of *Rhynia. Rhynia* was leafless and rootless and consisted of a branched underground rhizome attached to the soil by rhizoids, bearing slender forked leafless erect branches about 8 inches high. The reproductive organs are represented by large homosporous cylindrical sporangia at the end of stout stalks which the authors interpret as terminal portion of the main stem rather than of a special branch. Comparisons are instituted with the Devonian *Psilophyton* and with the recent Psilotales and the authors propose a new class—the Psilotales for *Rhynia* and *Psilophyton,* diagnosed by the sporangia being at ends of certain branches of the stem without any relation to leaves or leaflike organs. —*E. W. Berry.*

1612. Knowlton, F. H. Relations between the Mesozoic floras of North and South America. Geol. Soc. Amer. Bull. 29: 607–614. (1918) 1919.—Author discusses the known Triassic, Jurassic and Cretaceous floras from the two continents and concludes that there is little demonstrable relationship between the Triassic and Jurassic floras largely because of lack of knowledge of these floras in the greater part of the area, and that there is direct and strong evidence of land connection in what is known of the flora of mid Cretaceous or early Upper Cretaceous times.—*E. W. Berry.*

1613. Nathorst, A. G. Ginkgo adiantoides (Unger) Heer im Tertiar Spitzbergens nebst einer kurzen übersicht der ubrigen fossilen Ginkgophyten desselben landes. [Ginkgo adiantoides dominant in the Tertiary of Spitzbergen, and a brief review of related Spitzbergen fossils.] Geol. Fören. Forhandl. 41: 234–248. *fig. 4.* 1919.—Describes and figures *Ginkgo adiantoides* from Spitzbergen and supposedly related remains referred to the genera *Baiera, Czekanowskia, Phoenicopsis,* and *Feildenka* (or *Torellia,* as Nathorst shows it should be called). —*E. W. Berry.*

1614. Renier, A. Quelques nouveaux echantillons de végétaux à structure conservée du Westphalien de la Belgique. [New plant types from structures preserved in the Westphalian of Belgium.] Soc. geol. Belg. Ann. 41: B332–236. 1919.—Records specimens of *Lepidodendron, Trigonocarpus, Lepidostrobus, Medullosa, Mesoxylon* and *Stigmaria* with more or less structure preserved, in calcareous nodules in the Carboniferous marine shales of the Belgian Coal Measures.—*E. W. Berry.*

1615. Seward, A. C. Recent Paleobotany in Great Britain. Science 50: 43–48. 1919.—A succinct account of British contributions to our knowledge of fossil plants during the past five years.—*E. W. Berry.*

1616. Trelease, Wm. Bearing of the distribution of the existing flora of Central America and the Antilles on former land connections. Geol. Soc. Amer. Bull. 29: 649–656. (1918) 1919.—Describes the botanical break between the floras of the Greater and Lesser Antilles. A number of plant groups are discussed in some detail, namely, the oaks (*Quercus*), Nolineae, Yucceae, Phoradendron, *Furceaea* and *Agave.* Author concludes that the oaks afford no

evidence of land connections with North America, that the Nolineae and Yucceae indicate absence of any continental land connection, that *Phoradendron* and *Furcraea* suggest a former land connection with North and South America, and that *Agave* furnishes strong proof of a successively fragmented Antillean land bridge connecting with Central America in the Yucatan region.—*E. W. Berry.*

1617. Walkom, A. B. **The Floras of the Burrum and Styx River Series [Mesozoic Floras of Queensland. Parts 3 and 4.]** Queensland Geol. Surv. Publ. 263. *76 p., 7 pl.* 1919.—Author records 36 species of plants from the Burrum series of Queensland, concluding that the age is Lower Cretaceous. Several of the more interesting forms are figured and new species are described in *Sphenopteris, Phyllopteris, Microphyllopteris, Zamites, Taeniopteris* and *Araucarites.* The North American genus *Nageiopsis* is tentatively recognized from these beds. The Styx series contains but 14 species but is of great interest since among an assemblage of old types characteristic of the Burrum series it contains a considerable number of dicotyledonous types some of which are referred to the form genus *Celastrophyllum* which is so common in the Albian and Cenomanian rocks of North America.—*E. W. Berry.*

1618. Walkom, A. B. **On a collection of Jurassic plants from Bexhill, near Lismore, N. S. W.** Proc. Linn. Soc. New South Wales **44**: 180–190. *Pl. 7, 8.* 1919.—Author describes and figures *Comopteris hymenophylloides* var. *australica, Cladophlebis australis, Microphyllopteris pectinata, Cycadites* sp., *Taeniopteris spatulata, Araucarites cutchensis* and *A. gracilis* from beds belonging to the Clarence Series and of Jurassic age.—*E. W. Berry.*

1619. Walkom, A. B. **Queensland fossil floras.** Proc. Roy. Soc. Queensland **31**: 1–20. *Fig. 1–5.* 1919.—Presidential address, containing a summary of our knowledge of the fossil floras of Queensland. These include Paleozoic, Triassic, Jurassic, Cretaceous and Tertiary floras. Chief emphasis is given to the Mesozoic floras, which are well represented in Queensland and have been the subject of special study by the author.—*E. W. Berry.*

1620. Wieland, G. R. **Classification of the Cycadophyta.** Amer. Jour. Sci. **47**: 391–406. 1919.—Abstract of the history of classification of this ancient phylum, and a presentation of the authors present opinions on the relationships, geological history and classification of the cycad-like plants, illustrated by diagrams.—*E. W. Berry.*

1621. Wieland, G. R. **The needs of paleobotany.** Science **50**: 68–69. 1919.

PATHOLOGY

Donald Reddick, *Editor*

1622. Anonymous. **Regulation, etc., fungicides act.** Jour. Dept. Agric. Victoria **16**: 51–52. 1918.

1623. Appel, Otto. **Was lehrt uns der Kartoffelbau in den Vereinigten Staaten von Nord Amerika. [What potato culture in U. S. A. teaches us.]** Arb. Gesell. Förd. Baues wirts. zweckm. Verw. Kart. 17. *68 p., 20 fig.* Berlin, 1918.—General account of the climatic and other conditions under which potatoes are grown in U. S. A., description of methods employed in potato culture, an account of investigative work in progress, review of regulatory measures enforced, and an enumeration, with notes, of the insects and diseases of potatoes. American literature is noted in bibliographical footnotes.—*D. Reddick.*

1624. Ballou, H. A. **Chinch bug fungus.** Agric. News [Barbados] **18**: 154. 1919.—Record of *Sporotrichum globuliferum* parasitising cotton stainers [Dysdercus spp.] in Antigua. Author thinks a trial of the artificial spread of the fungus is worth making, but judging from results of similar trials elsewhere warns against expecting too much.—*J. S. Dash.*

1625. BARSS, H. P. **Prune troubles of non-parasitic nature.** Better Fruit 13[1]: 7–8, 24–26. 1919.—Address delivered before Oregon State Horticultural Society, Roseburg, Dec. 7, 1918.—Effects of the extraordinary climatic conditions in Western Oregon in 1918 upon the fruit of plums (prunes) is considered in a popular way. The following nonparasitic diseases or physiological disturbances are discussed at length: (1) "Gum spot" or formation of spots of a gummy substance either within or on the outside of green fruits. Affected fruit becomes irregular in shape and finally turns dark. Differences between the demand and supply of water during the critical time of the growing season is thought to be the cause of this disturbance. (2) Internal browning, another non-parasitic disease, is briefly considered. Sudden supply of moisture after a prolonged drought is mentioned as a possible cause. Conservation of the moisture supply in soil during the time of greatest demand of the tree is suggested as the most feasible remedy of the above non-parasitic diseases.—*A. E. Murneek.*

1626. BOYD, J. **Nectria cinnabarina as a parasite.** Quart. Jour. Forest. 13: 139. 1919.—In pruning young sycamores and elms in a plantation, every wound on all trees, with the exception of those on a few acres, was coated with coal tar. On the small section referred to, the wounds were treated with oil paint. In no single instance, was there an attack by *Nectria* on a tree which had tar applied to the wound. Where paint was used, 90 per cent of the trees were affected and about 20 per cent killed.—*C. R. Tillotson.*

1627. BÜSGEN, M. **Biologische Studien mit Botrytis cinerea. [Biological studies with Botrytis cinerea.]** Flora 111–112: 606–620. 1918.—In spite of numerous investigations on *Botrytis cinerea* since the time of deBary, many points regarding it are still much in need of light, especially the species question, the pathological relation of the fungus to a greater number of plants and the enzymes which it produces. The contributions in this article are to the last two problems. In an attempt to answer the question why so many plants growing under condition especially favorable to the development of *B. cinerea,* are not attacked by it, the author inoculated many species of plants. The strain used was isolated from the petals of *Pelargonium zonale.* The fungus was carefully studied in pure culture on a variety of media and the conditions under which sclerotia and appressoria are developed are briefly set forth. Since Beauverie obtained apothecia from *Botrytis* sclerotia, author hopes to obtain them from his fungus.—For inoculation work bits of agar containing growing mycelium served as inoculum. The leaves of the plants only were inoculated both above and below on each side of the midrib. The tissues on one side of the vein were injured by cutting. Infection took on the wounded side without exception on all the plants. The types of lesions produced are described for different hosts and the rate of spread of the mycelium in the tissues was compared in many of them. These variations in character and rate of development of the lesions resulting from wound infections are attributed to water content, chemical nature and aeration of the leaf tissues.—The action of the fungus on the chloroplastids, nucleus, middle lamella, cell wall, cuticle, etc., is described for a large number of hosts infected through wounds.—Of the 171 plants inoculated without wounding, 84 did not become infected. The factors conditioning penetration through the uninjured epidermis are discussed.—*H. H. Whetzel.*

1628. CAPUS, J. **Sur les invasions du mildiou dans le sudouest en 1916. [On the invasions of downy mildew in 1916.]** Ann. Serv. Épiph. 5: 193–200. 1918.—Correlation of telluric conditions existing in southeastern France with appearance and spread of *Plasmopara viticola* in the vineyards. It is concluded that humidity rather than temperature is the factor of importance in the progress of the disease.—*D. Reddick.*

1629. DAVEY, H. W. **Diseases of fruit trees and their treatment.** Jour. Dept. Agric. Victoria 16: 101–107. 1918.—Contains directions for treatment of the following diseases: black spot of apple and pear, shot-hole of stone fruits, peach leaf curl, Armillaria root rot, collar rot and chlorosis in citrus trees.—*D. Reddick.*

1630. Davis, D. J. **The effect of potassium iodid on experimental sporotrichosis.** Jour. Infect. Diseases 25: 124–131. *Fig. 1–2.* 1919.—Potassium iodid and iodin have relatively little germicidal effect on *Sporotrichum schenkii*, the organism surviving for at least 48 hours in a 10 per cent solution of potassium iodid and 74 days or more in a 1 per cent solution. Potassium iodid given to animals for 8 days previous to inoculation with Sporotrichum will have no effect in inhibiting or preventing the infection. On continued treatment the iodid will cure experimental sporotrichosis. It evidently does not act in a direct way on the Sporotrichum, but through the agency of tissue proliferation and processes incidental thereto. —*Selman A. Waksman.*

1631. de Castella, F. **Vineyard spraying.** Jour. Dept. Agric. Victoria 16: 141–156. 1918.—Descriptions of spraying machinery for vineyards, drawn largely from the French.—*D. Reddick.*

1632. de Castella, F. **Copper fungicides for vine disease.** Jour. Dept. Agric. Victoria 16: 592–599, 674–678, 735–737. 1918.—Summary statement on the preparation of copper fungicides, particularly of Bordeaux mixture, its chemistry, physical properties, adhesion, compatibility, etc.—*D. Reddick.*

1633. de Castella, F. **Downy mildew, Plasmopara viticola (B. & C.) B. & deT.** Jour. Dept. Agric. Victoria 16: 568–574. *6 fig.* 1918.—Downy mildew first appeared in Victoria in 1917. The loss from mildew in 1918 in north-east Victoria is over 90 per cent of the crop. Two per cent bordeaux mixture gave excellent control where used. It is thought that two applications of the mixture will give satisfactory results, but considerable space is devoted to an explanation of telluric conditions and epiphytotics.—*D. Reddick.*

1634. de Castella, F. **Notes on vine black spot or anthracnose.** Jour. Dept. Agric. Victoria 16: 420–425. 1918.—Anthracnose has been unusually prevalent and destructive on account of two successive rainy seasons. Sultanas were practically destroyed in some instances.—Swabbing the dormant vines (iron sulfate 35 pounds, sulfuric acid 8 pounds, water 10 gallons) combined with summer spraying with a copper fungicide is recommended. "On thoroughly swabbed vines a very limited number of sclerotia are capable of germinating when placed in a moist chamber at suitable temperature."—*D. Reddick.*

1635. Enfer, V. **Le chancre du poirier.** [Pear canker.] Revue Horticole 91: 217–218. Jan., 1919.—A list of varieties of pears susceptible to canker is given, together with methods of treatment. A canker similar to that of the apple and a list of varieties on which it has been found is mentioned. For the latter disease treatment similar to that for apple canker is detailed, together with the method for preparing and using a bath composed of iron sulfate, sulfuric acid and water which may be applied to the wounds and infected areas.—*E. J. Kraus.*

1636. Farrell, J. **Gnarl of the Gravenstein wood.** *In*: **Apple culture in Victoria.** Jour. Dept. Agric. Victoria 16: 648–652. *Pl. 178–180.* 1918.—"The gnarled wood is produced by the premature hardening of a lengthy section or sections of the cambium, thus preventing sap activity in these parts. Depressions, which run with the length of the affected stem or branch, are thus formed. The free passage of the sap promotes strong growth in the healthy portions, causing elongated protuberances to appear. These depressions, interspersed with the elevations running longitudinally in the surface of the wood, give it a corrugated appearance. This peculiar habit of growth, although generally regarded as being exclusively confined to the Gravenstein, is occasionally noticed in trees of the Missouri Pippin variety. Gnarl in the latter usually supervenes on variety degeneration and general debility, whereas robust specimens of the former are most liable to its attack.—A high percentage of Gravenstein trees become affected, and the twisting of the wood usually commences early in the life of the trees. In many instances, after a few years' growth, the stem is so extensively corrugated, and the sap flow so seriously interrupted, that the whole superstructure col-

lapses for want of plant nutriment. When the main arms or sub-leaders only are affected, the stem being healthy, the case is not so serious, because corrugations of the virulent form can bring about the destruction of individual branches only. Scientific pruning will often obviate the production of those undesirable sections or replace them by others of more befitting character."—*D. Reddick.*

1637. Fragoso, Romualdo González. **La "antracnosis" o "rabia" del guisante (Ascochyta Pisi Lib.). [Anthracnose or rabies of peas.]** Bol. R. Soc. Española Hist. Nat. 19: 189–196. *Pl. 5 (colored), fig. 1–3.* 1919.—Author studies a severe epiphytotic of anthracnose on peas encountered in markets of Madrid during the latter part of last winter and early spring. Causal organism is identified as *Ascochyta pisi.* It is compared critically with *Phyllosticta rabeiei.*—Discusses reported hibernation of fungus and believes such not to occur but that the fungus is propagated by pycnidia and conidia remaining on the ground in dead parts of the plant, this infecting next crop.—Contrary to some authors the fungus penetrates and attacks the seeds in the pod. Completing often the destruction begun by the *Ascochyta* the author finds commonly two fungi, *Cladosporium pisi,* and a form of *Macrosporium commune* which is published as new (*M. commune f. Pisi*), illustrated and described fully. Differs from type in having conidiophores up to 70 x 7 μ or even 125 x 7 μ, apically inflated, 15–56 x 9–21 μ. Author discusses briefly methods of treatment.—*O. E. Jennings.*

1638. Kirk, T. W. **Control of brown-rot of stone fruits: The past season's experiments.** New Zealand Jour. Agric. 18: 272–284. 1919.—It is stated that all the preparations used failed to prevent the disease entirely. Judicious thinning of fruits and the destruction of infected fruits is advised, to minimize the possibility of infection.—*E. R. Hodson.*

1639. Klebahn, H. **Impfversuche mit pfropfbastarden. [Infection experiments with graft hybrids.]** Flora 111–112: 418–430. *9 fig.* 1918.—In the experiments *Solanum lycopersicum* proved susceptible to the attacks of *Septoria lycopersici* while *S. nigrum* is immune. *S. tubingense,* which has epidermal tissue of *S. lycopersicum* and inner tissue of *S. nigrum,* proved highly resistant. Mycelium was found in the leaf but very small flecks were produced and the fungus did not fruit.—*Solanum proteus,* having a double layer of tomato tissue on the outside with additional areas of tomato tissue scattered promiscuously, proved susceptible. Pycnidia were formed, but were found most abundantly in the vicinity of tissue recognizable as tomato tissue (oxalate cells).—*S. koelreuterianum,* epidermis of *S. nigrum,* inner tissue of tomato, proved susceptible. Large blackish spots were formed on which pycnidia appeared later. Failure of the epidermal tissues to protect is attributed to the fact that infection is stomatal.—*S. gaertnerianum,* having a double layer of nightshade tissue about tomato tissue and with additional areas of nightshade tissue scattered promiscuously, proved immune in experiments performed in 1913. In later experiments some spots were formed on which pycnidia appeared. The pycnidia were always closely associated with tissue recognizable as tomato tissue.—*S. darwinianum,* having epidermis and inner tissue of *S. nigrum* separated by areas of tissue representing somatic cell fusions of the two species, is like *S. koelreuterianum.*—*S. lycopersicum gigas,* a giant form, among other things having chromosomes double the usual number, is as susceptible as the common tomato.—*Cladosporium fulvum* acted like *Septoria* on those chimeras tested.—*D. Reddick.*

1640. Kotila, J. E. **Frost injury of potato tubers.** Rept. Michigan Acad. Sci. 20: 451–460. 1918.—Tubers kept at room temperature for 5 days after being subjected to a temperature of —13°–17°C. for 3–4 hours showed necrosis injury; when exposed to temperature of —13° to —17° for five or more hours, less injury than when exposure was for 3 to 4 hours; and when exposed to —5° to —11° for 24 hours they showed darkening of the tissues. Exposure of tubers to a temperature of —13° to —17° for 4 hours killed the sprouts. [See Bot. Absts. 2, Entry 863.]—*Charles R. Stevenson.*

1641. Laidlow, W., and C. C. Brittlebank. **Black spot and leaf curl.** Jour. Dept. Agric. Victoria 16: 479–488. *11 fig.* 1918.—Experiments for the control of leaf curl of peach and apricot (*Exoascus deformans*) show that spraying with verdigris (3 pounds in 40 gallons

of water or copper soda (6:8:40) is effective. Bordeaux mixture (6:4:40) does not give as good results and lime-sulfur solution (1:9) was not a success. Copper soda is recommended.—"By spraying the trees just before or when the earliest buds are showing pink, leaf curl can be cured."—Black spot of apple (*Venturia inaequalis*) was controlled by the use of lime-sulfur solution. Of the 6 varieties included in the trials 5 were sprayed twice, both applications being made before the trees were in full bloom. Illustrations show that first application (1:15) was made before the blossom clusters had separated, the second (1:35) when many of the blossoms had opened. Satisfactory results were secured.—*D. Reddick.*

1642. Lewis, C. O. **Premature deterioration of fruit.** Better Fruit 13[1]: 5–7. 1919.—This is a popular address delivered before the Oregon State Horticultural Society, Roseburg, Dec. 7, 1918.—Burning, overmaturity, cracking, "drought spot," Jonathan spot, bitter pit, cork, fruit pit, dry rot and water core are cited as cases of premature deterioration of fruit. Lack of moisture in the soil during time of maturity of fruit or irrational irrigation, together with disturbances in nutrition, are given as possible causes of most of premature deterioration of fruit.—*A. E. Murneek.*

1643. Lüstner, G. **Über die seither in Österreich und Deutschland mit Perozid angestellten Peronospora-Bekämpfungsversuche und ihre Ergebnisse. [Summary of the use of perocid in Germany and Austria for the control of grape downy mildew.]** Mitt. Weinb. u. Kellerw. 1917: nos. 9 to 12; 1918: nos. 1 to 2.—Perocide and "Rohperozid" are not so good as Bordeaux mixture but in average years, give satisfactory control of downy mildew. The substances are easy to apply, they spread well and have good adhesion. Injury from their use is now practically negligible. [Through abst. by O. K. (irchner) in Zeitschr. Pflanzenkr. 29: 61. 1919.]—*D. Reddick.*

1644. Macoun, W. T. **Blight resistant potatoes.** Canadian Hortic. 42: 129–156. 1919.—Eight hundred varieties of potatoes have been grown at the Central Experimental Farm, Ottawa, Canada, during the past thirty years. Fifty-three varieties were eventually selected as apparently most resistant to late blight, and of these the following ten varieties were outstanding in resistance: King Edward, Dalmeny Beauty, Factor, Hard to Beat, Highlander, Duchess of Cornwall, White Giant, Dr. Maerker, Sirdar, Holborn Abundance. Of these all but the White Giant originated in Europe, where special attention has been paid to blight resistance.—*E. F. Palmer.*

1645. Marchal, P., and G. Arnaud. **Rapport phytopathologique pour les années 1916 et 1917. [Phytopathological report for the years 1916 and 1917.]** Ann. Serv. Épiph. 5: 1–35. 1918.—A long list, with short notes, of the insects and diseases affecting plants in France in 1916 and 1917.—Regulatory measures for the protection of plants and an account of the organization effected to combat plant pests and diseases.—*D. Reddick.*

1646. Miehe, Hugo. **Anatomische Untersuchung der Pilzsymbiose bei Casuarina equisetifolia nebst einigen Bermerkungen über das mykorhizenproblem. [Anatomical investigation of fungous symbiosis in C. e. with remarks on the mycorhiza problem.]** Flora 111–112: 431–449. *Pl. 6, 2 fig.* 1918.

1647. Montemartini, Luigi. **Esperienze di lotta contro la Peronospora delle patate. [Experiments on the control of potato late blight.]** Revist. Patol. Veg. 9: 126–130. 1919.—Demonstrations of spraying for the control of *Phytophthora infestans* on the potato were carried out at four places. One or two applications were made of dilute copper sulphate solution, Bordeaux mixture or "pasta caffaro" (a commercial Bordeaux paste). Increased yields ranged from 30 to 100 per cent. Potatoes from the sprayed portions of the fields also showed greater specific gravity, and a higher percentage of starch and of dry matter.—*F. M. Blodgett.*

1648. MOSLEY, F. O. **Fungoid and insect pests and their control. I. Vegetable and pulse drops.** *26 p., 53 fig.* F. O. Mosley: Reading, 1918.

1649. MÜLLER, KARL. **Rebschädlinge und ihre neuzeitliche Bekämpfung. [Diseases and insect pests of the grape and modern methods of combating them.]** *203 p., 2 pl. (colored), 1 map, 65 fig.* G. Braun: Karlsrube i. B., 1918.—Abst. in Zeitschr Pflanzenkr. 29: 55–56. 1919.

1650. NOWELL, W. **The root disease or red ring disease of coconut palms.** Agric. News [Barbados] 18: 46. 1919.—Continuation of previous notes (Agric. News 17: 298). Nematode worms found in all stages in diseased roots of Trinidad trees, exactly as in Grenada. Red cylinder in stem, which is a characteristic feature of the disease, was found to be breeding ground of the worm. Bases of leaf stalks may also be affected. Disease spreads from tree to tree but mode of infection remains to be discovered. Important to destroy stems, more so than roots. Name "red ring disease" now considered more appropriate than root disease.—*J. S. Dash.*

1651. NOWELL, W. **Foot rot or mal di gomma on limes.** Agric. News [Barbados] 18: 62. 1919.—The lime tree in the small West Indian islands is not very subject to this disease. Begins very often in the hollows formed by junction of roots with stem. Exudation of gum generally takes place, followed by drying up or rotting of bark. Regarded as being non-parasitic in origin and brought on by heavy soils, poor drainage and too deep or close planting. Tree surgery followed by use of wood preservative is recommended, the necessary attention being given to cultivation and drainage.—*J. S. Dash.*

1652. PETHYBRIDGE, GEORGE H. **A destructive disease of seedling trees of Thuja gigantea Nutt.** Quart. Jour. Forest. 13: 93–97. 1919.—Young larch and *Thuja* trees growing at the forestry station at Baumreagh, Queen's County, Ireland, were being killed. No fungus was visibly associated with the young larch; investigations of specimens showed, however, that the leaves and twigs were thoroughly permeated with the mycelium of *Botrytis.* This was, in all probability, the cause of the trouble.—The *Thujas* were 3 years old, about a foot or less in height, and nearly all quite dead. On the dead leaves small, rounded, flattened, brownish black, more or less gelatinous pustules were found in large number. When the diseased material became dry, the pustules became more or less hard or horny in texture. The fungus proved to be *Keithia thujina.* As far as known, this fungus has not been found elsewhere in the British Isles. Where cases of the disease occur in nurseries the dead and dying young trees should immediately be pulled up and destroyed.—*C. R. Tillotson.*

1653. RICHTER. [Rev. of: BARTOS, W. **Einige Beobachtungen über die Rostkrankheit des Rübenkrautes. (Observations on the rust diseases of beet tops.)** Blätter für Zuckerrübenbau 24: 152. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 263–265. 1918.—The sugar content of beets with sound, leafy tops was 22.02 per cent while that of diseased tops was 21.48 per cent. The sound beets produced about 340 g. of tops each, while the ones affected by rust produced only about 320. The yields of sugar were in the same relation as the weights of tops. Seed of these two types was planted the following year. The difference in the appearance of the two types was visible for some distance, the leaves of the plants affected with rust had a brownish color. The sugar content was 1.5 per cent lower in the beets with diseased tops.—*F. M. Schertz.*

1654. RITZEMA BOS, J. **Bijdrage tot de kennis van de werking der bordeauxsche pap op de aardappleplant. [A contribution to the knowledge of the action of bordeaux mixture on the potato plant.]** Tijdschr. Plantenz. 25: 77–94. 1919.—It is common knowledge that bordeaux mixture acts upon the potato plant as well as on the pathogene, *Phytophthora infestans.* Its action upon the latter is alone on the germ tube of the conidium or swarmspore due to the solvent action of acid secretions from the protoplasm on the fungicide.—The bordeaux may injure the potato plant through wounds which lay bare the cells beneath the

cuticle, the acid sap of the cells acting to dissolve some of the copper the same as the germ-tubes of *Phytophthora*.—The literature dealing with the effects of bordeaux mixture on uninjured healthy potato plants is reviewed in considerable detail, the conclusion being that the shading due to the mixture is probably the active factor. To test this the author conducted four sets of experiments with the blight resistant Red Star potato, having in each an unsprayed plot, one sprayed with lime milk, and one with bordeaux. Plots sprayed with lime milk gave the highest yield, that of the bordeaux being next highest in spite of the fact that the latter remained green from two to three weeks longer. The author's results thus support the conclusion that the beneficial effects of bordeaux on healthy plants is to be attributed to the shading it produces during very sunny seasons, while for the same reason the yield is reduced in cloudy seasons. These experiments are to be repeated on a more extensive scale in 1919.—*H. H. Whetzel.*

1655. Ritzema Bos, J. **De gevolgen van een fout bij het snoeien ban laanboomen. [The results of an error in pruning shade trees.]** Tijdschr. Plantenz. 24 (Bijblad): 49–51. 1918.—A popular presentation of the injurious results of leaving stubs in pruning, with special reference to attacks of *Nectria cinnabarina* through such wounds.—*H. H. Whetzel.*

1656. Rosen, H. H. **A preliminary note on a bacterial disease of foxtail.** Science 49: 291. 1919.—The disease appeared on foxtail (*Setaria glauca*) at Fayetteville, Arkansas, from September to November. Leaves, flowering stalks and glumes became spotted and streaked with dark brown areas. The pathogene, a white, rod-shaped bacterium, was isolated and grown in pure culture. By spraying and by needle smears, the following plants were infected: wheat, oats, rye, barley, corn and Sudan grass. The organism may be *Pseudomonas avenae.*—*A. H. Chivers.*

1657. Schoevers, T. A. C. **Nieuwe ziekten, waarop gelet moet worden. [New diseases, which may become dangerous.]** Tijdschr. Plantenz. 25: 95–98. 126–128. 1919.—There was observed in different places in Holland in 1918 a hitherto unreported disease of spinach. The symptoms exhibited were: a languishing and yellowing, with poor growth and final death of the plants in spots here and there in the beds. Affected seedlings showed a crumpling of the cotyledons. The tap root of disease plants was constricted for some distance below the crown, with a brownish discoloration of the tissues. Side roots were usually wanting or had taken the place of the tap root but showed the brown constrictions. Growing root tips were wanting.—Microscopic examination showed the contents of the cortical cells of the constricted region dead. The walls were brown; those of the vessels also darker than normal. Minute protozoan-like bodies filled many of the cells, especially those of the cortex, but occurred also in the cells of the endodermis, vascular bundles and root hairs. The organism is described in Mededeelingen van de Landbouw-hoogeschool, part 15, page 75. Attempts to reproduce the disease by growing plants in soil from diseased areas failed. The nature of the bodies in the cells of diseased roots has not been determined.—In tomatoes, petunias, asters, wall-flowers and *Gilia tricolor* there has been reported from Ireland by Pethybridge and Lafferty (Scientific Proc. Roy. Dublin Soc. 15: —. 1919) a new disease caused by a heretofore undescribed fungus, *Phytophthora cryptogea*. While this has not yet been reported from Holland the writer rather expects it may occur there. He reviews the paper of the above authors in some detail, especially that dealing with symptoms and soil infestation in order that Dutch growers may acquaint themselves with the disease and be on the lookout for it.—*H. H. Whetzel.*

1658. Schoevers, T. A. C. **Wat nu in den boomgaard gedaan kan worden ter bestrijding van ziekten en plagen. [What may now be done in the orchard toward combatting diseases and pests.]** Tijdschr. Plantenz. 25 (Bijblad): 1–4. 1919.—Timely notes on the more common fungous and insect pests of the orchard that may be combatted to some extent by pruning in the early spring. The diseases discussed are: monilia-rot, scab, cankers and witches' brooms.—*H. H. Whetzel.*

1659. Schoevers, T. A. C. **Het krullen van tomatenbladeren. [The rolling of tomato leaves.]** Tijdschr. Plantenz. 25 (Bijblad): 11–12. 1919.—The author calls attention to the frequent rolling of the lower leaves of tomato plants and points out its similarity to the leaf roll of potatoes. Quanjer has shown that the stems of leaf-rolled tomato plants are free from phloem necrosis. The author believes, however, that the rolling of the leaves results in both cases from the abnormal accumulation of reserve food stuffs in the leaves; in case of the potato as a result of the destruction of the phloem; in the tomato from severe pruning which eliminates the food-assimilating structures, the young shoots. This conclusion is supported by an experiment in which the author grew twelve tomato plants six of which were pruned in the usual manner. The leaves of the pruned plants were strongly rolled while the unpruned plants showed no trace of rolling in their leaves.—*H. H. Whetzel.*

1660. Smith, R. C. **Ear worm injuries to corn and resulting losses.** Jour. Econ. Entomol. 12: 229–233. *Pl. 11.* 1919.—Brief mention of progress of silking of corn ears, with reference, is made; also mention, with reference, to bacterial and mold activity in corn ear following the work of the corn ear worm (*Chloridea obsoleta*) and the effect produced on live-stock that had eaten grains thus affected.—*A. B. Massey.*

1661. Stevens, Neil E., and Fred W. Morse. **The effect of the endrot fungus on cranberries.** Amer. Jour. Bot. 6: 235–241. *3 fig., 1 table.* 1919.—The disease known as endrot of cranberries, caused by *Fusicoccum putrefaciens* Shear, is described as to its external characters and as to the course and behaviour of the fungus in the tissues of the fruit. The mycelium penetrates the whole berry, except the cuticle and seeds, and the hyphae pierce the cell wall and enter the cytoplasm. Chemical studies show that "the sugar content of berries rotted by the endrot fungus is much lower than that of sound fruit," thus suggesting that the fungus makes use of the sugar. No other constant chemical difference was observed between rotted and sound fruit.—*E. W. Sinnott.*

1662. Stranák, F. **Beiträge zur histologischen und physiologischen Erforschung der bakteriillen Krankheit der Gefässbundel der Kartoffelknollen. [Contribution toward histological and physiological investigation of the bacterial disease of the vascular tissue of the potato tuber.]** Centralbl. Bakt. II, 48: 520–543. *2 fig.* 1918.—An account of a bacterial disease of the potato, manifest by dying of the sprouts before reaching the surface of the ground, stunting and dying of the tops, translucent and brownish discoloring and spotting of the stem, black spotting of the vein regions of the leaves, failure to set tubers or the development of tubers either entirely normal or with the vascular region partly or entirely discolored grayish-brown to black. By analysis, healthy tubers show a higher acidity and a greater percentage of magnesium, water and, in most cases investigated, of potash than diseased ones; consequently, fertilizing with potash and magnesium is suggested as a possible means of control. Tubers of susceptible varieties show a thinner skin, fewer layers of cork cells and more often a higher water content than tubers of more resistant varieties. Rod-shaped bacteria found abundantly in the darkened regions of the tubers are thought to cause the disease and it is also thought that they are transmitted by way of the seed-piece. —*Charles R. Stevenson.*

1663. Taubenhaus, J. J. **Pink root of onions.** Science 49: 217–218. 1919.—The disease is confined to the roots only, and not to the bulb. Affected roots turn yellow, then pink, and finally dry. The bulb spends its energy producing new roots which in turn become affected. Hence the failure of the bulbs to reach commercial size. Average annual loss in Webb County estimated at 40 per cent. The disease is caused by an apparently new pathogenic organism, to which the name *Fusarium malli*, n. sp. is to be applied. Results of experiments are summarized as follows: The organism is carried with infected sets and remains in the soil from year to year, attacking onions, garlic and shallot. Steam sterilizing and treatment with formaldehyde at the rate of 1 pint to 20 gallons of water, per square foot [So in original.] will rid the soil of the fungus. Lime will not kill the fungus in the soil.

In infested soils, liberal application of fertilizers, especially those rich in nitrogen and humus, aids in producing fairly normal yields. Author first reported the disease in Phytopath. 7: 59. 1919.—*A. H. Chivers.*

1664. Tunstall, A. C. **A stem disease of tea caused by Nectria cinnabarina (Tode) Fr.** *6 p., 4 pl.* Indian Tea Assoc.: Calcutta, 1918.—The diseased bushes become moribund, but rarely die outright. The stems die back, and new shoots, generally thin and weak, spring up from below. The bark, cambium, medullary rays, pith, and wood are affected, the fungus apparently gaining entrance through wounds. Descriptions of the fungus by the author, by Wilson and Seaver, and from Saccardo are given, also a list of synonyms by Seaver.—The flowering shoots of *Alnus nepalensis*, *Pyrularia edulis*, and *Erythrina* are attacked by the fungus and serve as sources of inoculum. Control measures recommended are: eradication of trees (in immediate neighborhood) harboring the fungus; pruning diseased bushes in "cold weather," followed by spraying with a fungicide; and burning of prunings. [See Bot. Absts. 3, Entry 1199.]—*J. I. Lauritzen.*

1665. Turconi, M. **Un nuovo parassita dei peperoni (Acrothecium Capsici n. sp.) [A new parasite of pepper.]** Revist. Patol. Veg. 9: 131–133. 1919.—In examining some peppers (*Capsicum annuum*) sent from the Royal normal school of Turin some were found with yellowish white areas, which later became dark-colored, due to the fruiting bodies of *Alternaria tenuis*, a common saprophyte. There were other round or oval depressed spots, 1–3 centimeters in diameter, of hazel color with chestnut brown margins, in which appeared a thin, olivaceous yellow mold which the author names *Acrothecium capsici*. A technical description is given.—*F. M. Blodgett.*

1666. van der Lek, H. A. A. **Over de z. g. verwelkingsziekten, in het bijzonder die, welke door Verticillium alboatrum veroorzaakt worden. [Regarding the so-called wilt diseases, especially those caused by Verticillium alboatrum.]** Tijdschr. Plantenz. 24: 205–219. *Pl. 4, fig. 1–3.* 1918. *Ibid.* 25: 17–52. *Pl. 1–2, fig. 1–4.* 1919.—In an introduction of 14 pages, the author first records an exceptionally severe outbreak of Verticillium wilt of potatoes in Holland in 1918, and also its occurrence in tomatoes, cucumbers and melons. He also presents a rather detailed and critical review of the literature dealing with Verticillium diseases, examining especially the evidence on host range, biological strains, identity of *Verticillium* and *Acrostalagmus* species, the disease in woody plants, and the peculiar position of the potato as a host of *Verticillium*. In this last connection he calls attention to the recorded inability of *Verticillium* strains from perennial hosts to infect annuals, while strains from the latter readily attack the former. This he attributes to a loss of virulence due to continuous confinement to a perennial host. He here reports for the first time isolation of *Verticillium* from *Thuya*, *Prunus* (cherry), *Ampelopsis veitchii* and *Ribes* (currant).—Parts II, III and IV in volume 25. They are devoted respectively to a consideration of: variations in the symptoms of the disease in the same and different hosts; the potato verticilliose in particular; and dissemination and methods of combating the pathogene. An addenda presenting some observations on papers appearing after this article went to press completes the contribution.—After discussing the physiology of wilting in plants the author points out that this is rather rare as a symptom of Verticillium diseases. When it does occur he holds it is due to a killing of the rootlets growing in infested soil. Plants so affected usually recover shortly to show later the more common symptoms; dwarfing, dead spots with yellowish borders in the leaves or the slow dying of leaves on the stems from below upwards. In his opinion wilting rarely or never occurs in potato plants infected from diseased mother tubers. He rejects the theory of wilting due to toxic substances secreted by the fungus, as also that of the plugging of the vessels by the mycelium.—In part three is presented evidence to support the conclusions that diseased mother tubers give usually infested daughter tubers, while healthy tubers from diseased plants never produce diseased plants; that the fungus spreads slowly during storage from the stem end through the vessels toward the eyes; that the variations in symptoms so often noted for this disease especially in potatoes, is to be ex-

plained primarily by the character of the initial invasion, whether from infested soil or from diseased seed tubers.—The very general appearance of the disease in so many hosts in 1918 throughout Holland is attributed chiefly to the severe drought of that season. The habit of overwintering in the potato tubers is chiefly responsible for the general and widespread distribution of the fungus. Nothing new on the control of the disease is offered. The author concludes after reviewing the possible lines of attack that the development of resistant varieties in the most promising.—*H. H. Whetzel.*

1667. Verhoeven, W. B. L. **Zaaigraanonsmetting.** [**Disinfection of seed grain.**] Tijdschr. Plantenz. 25: (Bijblad): 5–10. 1919.—Specific directions are given for the seed treatment of the common cereals, wheat, oats, barley and rye, for protection against the common muts, *Fusariums* and *Helminthosporiums*, which are seed borne.—*H. H. Whetzel.*

1668. [Popp, M.] [Rev. of: Wagner, R. J. **Wasserstoffionenkonzentration und natürliche Immunität der Pflanzen (Hydrogen-ion concentration and natural immunity of plants.)** Centralbl. Bakt. 33: 708–719. 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 258–259. 1918.—Injections of phytopathogenic bacteria cause plants to respond with variations in the hydrogen-ion concentration. Immediately after injection the acidity decreases. At the end of the incubation period the acidity rises 0.2 to 0.3 per cent. If the plant is able to withstand the infection the acidity then falls back to normal. If the plant is unable to withstand the infection the hydrogen-ion concentration rises to a very high level and then falls usually below the normal. If the infection is fatal there is usually a post-mortem rise in acidity.—*F. M. Schertz.*

1669. Wolf, F. A., and R. O. Cromwell. **Clover stem rot.** North Carolina Agric. Exp. Sta. Tech. Bull. 16. *18 p., 3 pl.* 1919.—First evidence of the disease is a sudden wilting of stem and leaves. These portions succumb quickly turning yellowish and then brown. The stems near the surface of the ground and stool are involved and are covered with a more or less profuse mould-like growth. This is followed by the formation of black sclerotia on the decaying stems. The roots are also involved and sclerotia formed on them remain in the soil. The disease is prevalent from October to May and spreads outward from localized areas causing an uneven stand. Under favorable conditions the stand may be rather uniformly destroyed. *Sclerotinia trifoliorum* is the cause of the disease. The hosts are red clover, crimson clover, white clover, alsike clover, and alfalfa. Comparative studies of *S. trifoliorum* and *S. libertiana* were made and lettuce and crimson clover were infected when inoculated with either organism. Comparative morphological studies indicate that *S. libertiana* and *S. trifoliorum* are distinct species.—Fungus may be disseminated by sclerotia mixed with the seed at harvest time. Other agencies of dissemination are contaminated soil, implements, and hay. The organism is kept alive in soil by sclerotia which remain dormant for some time. Burial of the sclerotia by deep plowing, avoidance of contaminated seed, exercise of care when soil is used to inoculate new fields with legume bacteria, avoidance of use of manure from stock fed on hay from infested fields, and adoption of a system of crop rotation are recommended as control measures.—*R. A. Jehle.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOZY

Henry Kraemer, *Editor*

NEW PLANTS FOR PHARMACEUTICAL USES

1670. Arias, Bernardo. **Una planta util. El cilantro de la tierra.** [**Coriander, a useful plant.**] Revist. Agric. Com. y Trab. 2: 343. *1 fig.* 1919.—Attention is called to use as a condiment and medicine of *Eryngium foetidum* Linn., a plant common in Cuba.—*F. M. Blodgett.*

1671. Fletcher, Geo. **Red Cross work at the Royal College of Science.** Jour. Dept. Agric. Ireland 19: 322–326. 1919.—Describes sphagnum moss and its collection and use for medical purposes.—*Donald Folsom.*

1672. Menon, C. Rarunakara. **Embelia ribes—a medicine for influenza.** Indian Forester 45: 210. 1919.—Root decoctions of the plant—Family Myrsinaceae—reported as an effective cure and preventive of influenza during the recent epidemic in South Kanara.—*J. R. Schramm.*

1673. Viehover, Arno. **Chinese colza—A valuable new oil seed.** Oil, Paint and Drug Reporter 96[10]: 53. *4 fig.* 1919.—Calling attention to the shifting centers of production due to war conditions, the author refers to the increased importance of oriental countries as sources of oil seeds.—Prior to the war Chinese and Japanese seeds were practically unknown in U. S. A. But so great is the shortage in Europe that these oil seeds are likely to come into American markets from the Orient for some years. Entering at San Francisco, these Chinese seeds were at first marketed as "Golden Gate" seeds and offered as mustard, to which they bear a striking resemblance in appearance. They are quite lacking in pungency, however, and taste more like cabbage than mustard. The seeds are somewhat smaller than those of white mustard which they closely resemble except in taste. They were identified as the seed of *Brassica campestris, var. Chinensis,* related to the "China cabbage" and "celery cabbage." The microscopic characters are similar to those of the common colzas or rape seeds. They yield 40–50 per cent of fatty oil similar to that from rape. The marc yielded, upon maceration with water, from 0.4 to 0.6 per cent of a volatile oil, identified as "crotonyl mustard oil," found also in rape seed, and quite different in physiological characters from the volatile oil "allyl mustard oil" obtained from the true mustards. Crotonyl mustard oil is but slightly pungent and irritating and is not poisonous, while allyl mustard oil is highly irritating and poisonous. The basal leaves of the young plant are succulent and should be valuable for salad. The plant is hardy and may prove a desirable forage crop. Illustrations of the fruiting plant, the basal leaves and the seeds, both yellow and brown, accompany the article, the complete manuscript of which will be published in a bulletin of the Department of Agriculture.—*W. B. Day.*

MEDICINAL PLANT CULTURE AND PREPARATION

1674. Alsberg, Carl L., Arno Viehoever, and Clare Olin Ewing. **Some effects of the war upon crude drug importations.** Jour. Amer. Pharm. Assoc. 8: 459–471. 1919.—A comprehensive report of the effect of war conditions on drug imports and spices. Eighteen well known drug products are considered, the data being set forth in tabular form showing the imports (in thousands of pounds), declared value per pound and wholesale price of selected grades for the years 1913 to 1918 inclusive. Imports of these eighteen commodities with the exception of buchu, gentian and crude opium showed a marked falling off from the figures of 1913, these products being among the list of those on which new tariff duties were placed. An interesting account of drug adulteration follows which the authors divide into five sections as follows: (1) Material containing toxic foreign matter; (2) Material of value as substitutes for recognized products; (3) Material unsuitable for use as substitutes for recognized products, but valuable for other purposes; (4) Material of uncertain value, requiring further study; (5) Material of no known value. Data is presented on adulterations under the various divisions.—*Anton Hogstad Jr.*

1675. Cushman, Allerton S. **Growing medicinal plants in America.** Jour. Heredity 10: 32–38. *Fig. 1–3.* 1919.—See Bot. Absts. 3, Entry 1061.

1676. Clute, Willard N. **Officinal drugs of the United States.** Amer. Bot. 25: 47–50. 1919.—A list of the native plants that may be substituted for official drugs with notes on how and where to sell them.—*W. N. Clute.*

1677. Cocx, M. M. A. **Valeriana officinalis.** Pharm. Weekblad 56: 735–755. 1919.—The best paper submitted in a contest on this subject conducted by the Dutch society for the advancement of pharmacy. The author gives a very complete description of the plant in the different stages of development, of its cultivation and of the chemical estimation of its constituents.—*H. Engelhardt.*

1678. COOMBES, G. British plants of medicinal value. South African Gard. 8: 57–58. 1919.

1679. CUNAEUS, E. H. J. De proeftuin voor Genoeskruiden te Delft in 1918. [The experimental garden for medicinal plants at Delft in 1918.] Pharm. Weekblad 56: 351. 1919.—A report in regard to plants and seeds obtained in cultivating medicinal plants. It comprises 25 different plants and 64 species of seed. The results of the experiments were very satisfactory.—*H. Engelhardt.*

1680. FAIRBRIDGE, DOROTHEA. South African herbs. I and II. South African Gard. 9: 79–81. *150 fig.* 1919.

1681. GUÉRIN, P. [Rev. of GORIS, A., AND DEMILLY, J. La culture des plantes médicinales. Préface de M. L. Guignard, Vigot fr., edit., Paris, 1919. (The cultivation of medicinal plants. With a preface written by M. L. Guignard.) Vigot Frères: Paris, 1919.] Bull. Sci. Pharm. 26: 339. 1919.

1682. HAMILTON, HERBERT C. Digitalis leaves: Effect on activity of temperature in drying. Jour. Amer. Chem. Soc. 41: 125–130. 1919.

1683. HAMILTON, HERBERT C. Pharmacological assaying. Jour. Amer. Pharm. Assoc. 8: 49–64. 1919.—Author presents a historical and descriptive discussion of pharmacological assaying in general, followed by a summary of the work accomplished on the assay of *Cannabis sativa*, Ergot, the Digitalis series, pituitary gland and suprarenal gland. With bibliography.—*Anton Hogstad, Jr.*

1684. KILMER, F. B. The study of drugs. Amer. Jour. Pharm. 91: 139–147. 1919.—The author briefly reviews the present knowledge of several of our more common drugs as belladonna, aconite, aloes, etc., pointing out the fact that very little is really known about them at the present time. "As pharmacists we are most interested in its active principle. What is the active principle of belladonna? The usual answer is "atropine." Is this the correct answer? Investigation has shown that atropine does not exist in cultivated belladonna, nor indeed in belladonna when carefully handled and dried. Atropine is a product, or a derivative, produced during the manipulation of the drug."—*Anton Hogstad, Jr.*

1685. KOCH, GEORGE P. The cultivation of medicinal plants. Jour. Amer. Pharm. Assoc. 8: 275–281. 1919.—A short history of the cultivation of medicinal plants, which had its inception in the middle of the sixteenth century, is given. The impetus given the industry in this country, as a result of the recent war and consequent check on the importation of crude drugs, is touched upon, as well as the experimental work carried out by federal and state governments in their endeavor to help make it a profitable enterprise. Detailed methods are given for the proper handling and cultivation of belladonna, hyoscyamus, digitalis, cannabis, and stramonium.—*Oliver A. Farwell.*

1686. KOCH, GEORGE P., AND J. RUSSELL BUTLER. Digitalis purpurea. Amer. Jour. Pharm. 91: 211–221. 1919.—A comprehensive report on a number of experiments covering the most important phases of the cultivation of *Digitalis purpurea*, so that a successful and paying crop may generally be obtained even in localities not exceptionally favorable for its growth. The paper includes a study of germination, planting, effect of fertilization, effect of certain inorganic salts upon the growth and active constituents, effect of drying at different temperatures upon the activity. With summary and bibliography.—*Anton Hogstad, Jr.*

1687. KOCH, GEORGE P. Hyoscyamus Niger. Amer. Jour. Pharm. 91: 68–83. 1919.—Author presents data on the commercial culture of *Hyoscyamus niger* which includes a study of the following: seed germination, effect of inorganic fertilizers upon growth and development, control of insects, seed formation, alkaloidal content and the utilization of the various

parts of the plant. As to the latter the author reports that the stems, collected when the plants are green, can probably always be utilized in conjuction with the leaves and the total alkaloidal requirement of the U. S. P. of 0.065 per cent, be met. With summary and bibliography.—*Anton Hogstad, Jr.*

1688. Polak's Frutal Works. **Pepermunt cultuur in Nederland. [Cultivation of peppermint in Holland.]** Pharm. Weekblad 56:41. 1919.—Peppermint cultivated in Holland yielded an oil which compared favorably with American oil obtained from peppermint cultivated in Wayne County, Michigan.—*H. Engelhardt.*

1689. Woodhams, E. L. **The commercial growing of some European drugs in Michigan.** Jour. Amer. Pharm. Assoc. 8: 478–482. 1919.—Author discusses the various problems confronted in the commercial cultivation of belladonna and hyoscyamus in Michigan.—*Anton Hogstad, Jr.*

COMMERCIAL SUPPLIES

1690. Howard, B. F. **The trade in Cinchona bark.** Amer. Jour. Pharm. 91: 231–233. 1919.—A brief review of an article on the future of the trade in Cinchona bark, which appeared in Bull. Imp. Inst. 16³. 1918. Reference is made to the history of this bark but the paper deals for the most part with its production. The author states that Java heads the list of producers, with an annual output of 22,880,000 pounds, India supplying 2,000,000 pounds and other countries 440,000 pounds. Although from a commercial point of view, the plantations in St. Helena and East Africa are at the moment negligible, yet from the scientific aspect the typical analyses given are of considerable interest as they show a high percentage of quinine and prove the bark to be well up to the Java standard, thus indicating the most successful cultivation—which may have been either deliberate or accidental. (Reprinted from Jour. Soc. Chem. Ind., Feb., 1919.)—*Anton Hogstad, Jr.*

1691. Anonymous. [Rev. of: William Mansfield. **Squibb's atlas of the official drugs.** *686 p., illust.* 1919.] Druggists Circ. 63: 243. 1919.—All the drugs of the Pharmacopoeia and National Formulary are illustrated (in the atlas) in halftone from photographs of drugs selected by the author. Under each drug name are given the official title, synonyms, parts used, permissible limits of impurities, assay, official preparations, and much other essential information. Contains a glossary of botanical terms; tables of assays and of doses; and a very comprehensive index.—*Oliver A. Farwell.*

1692. Marie-Victorien, Fr. des E. C. **Notes recueillies dans la region du Tamiscamingue. [Notes collected in the region of the Temiscaming, Quebec.]** Naturaliste Canadien 45: 163–169. May, 1919.—In the course of a botanical exploration in June, 1918, the author had an opportunity of making inquiries from the Indians and missionaries in the region of Lake Temiscaming, far up and north of the Ottawa River, as to the names and supposed or real virtues of many of the wild native plants and trees. The traditional pharmacopocia of these Indians is likely soon to disappear. As a rule they are not disposed to be free with such information. They are ready to bring an ingredient or a decoction prepared, but slow to show where to get the material. Author's chief authorities are: R. P. Beaudry, O.M.I., curé of North Temiscaming; Mr. John King, chief of the Algonquins of Nédelec reserve; Mme. Vaya, an Indian resident at Ville-Marie; and Mr. Carufel, a hunter living at Lac des Quinze on Bay Gilies.

Thuya occidentalis is used as a poultice in rheumatism, in labor, for the resolution of ankylosis, and in a vapor bath for pleurisy, the heat being generated by hot stones dropped into the bath well charged with the branches. *Sarracenia purpurea* is assumed to be a sovereign remedy for small-pox and for the healing of any kind of sores. *Sorbus Americana* is believed to be a very general health stimulant. Portions of the spray of the following boiled for some hours is used to purify or strengthen the blood: *Sorbus Americana, Picea marina, Picea*

Canadensis, Gaultheria procumbens, Sambucus Canadensis, with a little wine. *Coptis trifolia* is used to cure sores of the mouth and to excite appetite; and also to allay inflammations of the skin. *Cirsium arvense* is used against eruptions generally, especially those caused by *Rhus toxicodendron.* By seeking out the latter plant which caused a poisoning, and boiling it in a kettle of water and finally pouring the whole into the water, the poison spell is said to be broken and the victim recovers. *Solidago Canadensis* makes an infusion curing fever. *Vaccinium Pennsylvanicum* roots make an infusion to cure the suppression of urine. The roots of *Epilobium angustifolium* make a poultice to cure boils. The infusion of leaves of *Ledum Groenlandicum* is a stimulant, is used as a tonic before labor; and the leaves are used against headaches. An infusion of *Polypodium vulgare* is said to be a cure for dyspepsia. The flower of *Ranunculus acris* is used against headaches. *Anemone cylindrica* and *A. multifida* are used also for the same purpose in the region of the Rocky Mountains. The leaves are reduced to snuff which cause tears and sneezing, followed by a sense of relief. *Actaea alba* is used by the Temiscaming Indians in menstrual disturbances. *Clintonia borealis* has a root which when grated into powder and added to the bait attracts bears to the traps from great distances. The bark of *Populus tremuloides* powdered and mixed with sugar is taken as a vermifuge. *Achillea millefolium* when fresh and green is good for burns. The gum from *Abies balsamea* is used for burns and abscesses. *Anaphalis margaritacea* is used as poultices on burns. If one places a stick of *Fraxinus Americana* in the stove, the juice oozing out of its ends is said to cure earaches.—*A. H. MacKay.*

1693. Burkill, I. H. **Notes on Cola trees in the Economic Garden, Singapore.** Gardens' Bull. Straits Settlements 2: 74–86. *Fig. 1.* 1918.

1694. Cremata, Merlino. **Plantas medicinales populares. [Popular medicinal plants.]** Revist. Agric. Com. y Trab. 2: 153–155. *2 fig.* 1919.—Some medicinal uses commonly made of *Cissus sycioides* Lin. and *Cajanus indicus* Lin., are discussed.—*F. M. Blodgett.*

1695. Anonymous. **The economic resources of Burma cutch.** Chem. and Druggist 91: 705, 737.—The cutch of commerce is an extract prepared from several plants but its chief source is the wood of *Acacia Catechu,* native of India and Burma. This extract is also known as black catechu, Pegu cutch and Terra Japonica. Trees of a circumference of three feet or more are used; the bark is removed and used locally for tanning; the wood chipped by hand labor, the chips packed in earthenware jars covered with water and boiled. As the liquor thickens it is strained into other vessels and evaporated by heat until the extract will harden on cooling. The best grade is formed into blocks covered with large leaves; a poorer grade is poured into mats molded in the sand.—Cutch has been used in Burma from time immemorial as a dye, for tanning and extensively to toughen fish lines, nets and canvas exposed to water. It has been exported for eighty years, and in 1915 the exports were 8526 tons. During the war the exports have markedly fallen off. As the forestry department of Burma is so greatly undermanned, the huge reserve forests are suffering many depredations and it is estimated that 15,000 cutch trees are illegally cut annually.—*E. N. Gathercoal.*

ANATOMY

1696. Anonymous. [Rev. of: Malmanche, L. A. **Contribution à l'étude anatomique des Eriocaulonacées et des familles voisines: Restiacées, Centrolépidacées, Xyridacées, Philadracées et Mayacacées. (Contributions to the anatomical study of the Eriocaulonaceae and related families: Restiaceae, Centrolepidaceae, Xyridaceae, Philydraceae and Mayacaceae.) Thesis for deg. Dr.Sc.** Girault: St. Cloud (Paris), 1919.] Bull. Sci. Pharm. 26: 297. 1919.

1697. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. 57: 125–126, 143–145. *Fig. 10–12.* 1919.—The fruit of *Berula angustifolia* Koch is rounded, laterally compressed, with the stylar cushion, both of the bent styles and a short 5-pointed calyx evident, 2 mm. long, 2 mm. deep and 1 mm. broad, dark-brown to yellowish-brown. The vittae form an almost closed

ring, two neighboring vittae sometimes being fused together. *Athamanta cretensis* L. fruit is elongated, grayish-brown, tomentose, crowned with a collar-like stylopodium and the long curved styles, 5 mm. high, 1.5 mm. deep, and 1 mm. broad. The ribs are not noticeable and the cremocarp not readily separable into its component mericarps. Two or three, seldom one, vittae are found in the ground tissue of the mesocarp between each 2 ribs. In the primary ribs outside of the fibrovascular bundle lie one, two or three small secondary oil reservoirs. The cells of the mesocarp contain a yellowish substance. The outer epidermis contains numerous hesperidin crystals of rosette, plumose or fine needle types. [See also next following Entry, 1698.]—*Heber W. Youngken.*

1698. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. **57**: 183–188. *Fig. 13–15.* 1919. —The macro- and micro-morphological characteristics of the fruits of *Oenanthe Phellandrium* Lam., *Aethusa Cynapium* L., and *Levisticum officinale* Koch are considered together with the habitats of the plants yielding them. *Oenanthe Lachenalii* Gmel. fruits show thick walled wood parenchyma only in the ribs. The sclerenchyma fibers are arranged as in *O. Phellandrium.* In *Oenanthe pimpinelloides* fruits the sclerenchyma plates are more broadly developed in the ribs than in *O. Phellandrium*, but are extended over the vittae in a more layered band up to four cell rows broad. [See also next preceding Entry, 1697.]—*Heber W. Youngken.*

1699. Van Wisselingh, C. **Bijdragen tot de Kennis van de zaadhuid. Derde bijdrage: Over de zaadhuid der Papaveraceen en Fumariaceen. [Contributions to the knowledge of seed-coats. Third contribution: About the seed-coats of the Papaveraceae and Fumariaceae.]** Pharm. Weekblad **56**: 849–865. *Pl. 1, fig. 5.* 1919.

ADULTERATION AND PHARMACO-ANALYSIS

1700. Gathercoal, E. N. **Couch grass versus Bermuda grass.** Jour. Amer. Pharm. Assoc. **8**: 26–32. *Fig. 1–8.* 1919.—A historical, morphological, chemical and therapeutical discussion of *Agropyron repens* and *Capriola Dactylon*, with bibliography.—*Anton Hogstad, Jr.*

1701. Zufall, C. J. **The structure of Bermuda grass compared with that of triticum.** Jour. Amer. Pharm. Assoc. **8**: 472–473. *Fig. 1–2.* 1919.—A comparison of the structure of Bermuda grass (*Capriola Dactylon*) with that of triticum (*Agropyron repens*). The dried rhizome of *Capriola* is seldom less than 2, and usually 3 mm., or more in diameter, and is usually hard and brittle, whereas triticum is seldom more than 2 mm. in diameter and usually soft and pliable. A marked difference is noted in the cortex, that of Bermuda grass being about one-fourth as broad as that of triticum and containing only 1 or 2 vascular bundles, whereas the cortex of triticum contains 6 or 7 bundles. Endodermis is absent in Bermuda grass, pith is four or five times as broad as that of triticum. In Bermuda grass there are from 30 to 35 bundles scattered throughout the pith, while in triticum there are only 10 or 12. Powdered Bermuda grass exhibits a large amount of starch and the powder is also characterized by the absence of endodermal cells.—*Anton Hogstad, Jr.*

1702. Ewing, Clare Olin, and Joseph F. Clevenger. **Ballota hirsuta, Benth. An adulterant of horehound (Marrubium vulgare L.).** Jour. Amer. Pharm. Assoc. **8**: 273–275. *Fig. 1–2.* 1919.—A morphological study of *Marrubium vulgare*, *Ballota hirsuta* and *Ballota acetabulosa*, to aid in the identification of the materials offered for entry as "horehound," over which a great deal of confusion has arisen during the past two years. The following are the distinguishing characteristics: The calyx of true horehound, which is only about half as large as those of *Ballota acetabulosa* and *Ballota hirsuta*, is tubular, whereas the calyx of both *Ballota* species is nearly funnel-shaped. The calyx of *Ballota acetabulosa* has 10–20 obtuse lobes, which are crenate, whereas the marginal lobes of *Ballota hirsuta* are dentate. The leaves of *Marrubium vulgare* are tufted and usually curved or bent and sessile, whereas those of *Ballota hirsuta* are usually straight and are somewhat elevated by a multicellular basal stalk.—*Anton Hogstad, Jr.*

1703. YOUNGKEN, H. W. **Ballota hirsuta, a recent adulterant for Marrubium vulgare.** Amer. Jour. Pharm. 91: 147–156. *Fig. 1–9.* 1919.—A report on the examination of a shipment labeled "horehound herb" that had been sent from a Greek port to a Philadelphia firm but which had been condemned by the government on the ground that it contained an adulterant. Examination showed shipment to contain "*Ballota hirsuta.*" The macroscopical and microscopical characteristics of both *Marrubium vulgare* and *Ballota hirsuta* are fully discussed and are shown in a series of photographs and sketches.—*Anton Hogstad, Jr.*

1704. KNAPP, A. W. **The separation and uses of cacao shell.** Amer. Jour. Pharm. 91: 107–112. 1919.—An account of the method of separation and uses of cacao shells. The author states that the world production of cacao shell is found to be about 36,000 tons per year, of which Europe consumes 22,000 tons, the consumption in Great Britain being 4773 tons. Analyses of the roasted and unroasted shell and a discussion of the price of cacao shell are also given. (Reprinted from Jour. Soc. Chem. Ind., July, 1918.)—*Anton Hogstad, Jr.*

1705. ANONYMOUS. **Japanese chiretta.** Chem. and Druggist 91: 733. 1919.—Under this name a new substitute for Indian chiretta was offered at a recent drug sale in London. It is used in Japan in medicine as a bitter tonic, and was described in a list of Japanese drugs received from Japan by the late Mr. Thos. Christy in 1879. In Japan it is known as toyaku or semburi. The plant is about a foot high and bears some resemblance in foliage to *Erythraea Centaurium,* with flowers somewhat like those of *Chlora perfoliata,* but having pinkish-white flowers striped with purple. It is interesting botanically on account of the stigma being prolonged downwards over the edges of the valves of the ovary, whence the name given by Grisebach, *Pleurogyne rotata.* MATSUMURA in his "Index Plantarum Japonicarum" (p. 503) places it under *Swertia Chinensis,* and gives as synonyms *Pleurogyne rotata* and *Ophelia diluta.* The plant is widely spread in Japan and there are eleven other Japanese species of the genus *Swertia.* The drug is reported to be more bitter than the Indian chiretta. So far as pharmacy is concerned, the short stature of the plant and the larger prominent flowers will serve to distinguish it easily from the Indian drug.—*E. N. Gathercoal.*

1706. CLAASSEN, EDO. **Examination of a sample of gum asafoetida.** Amer. Jour. Pharm. 91: 164. 1919.—The author reports that a sample of gum asafoetida in which whitish, shining specks could be seen contained 54.45 per cent of gum, 35.51 per cent of calcite and 10.04 per cent of granite, the adulteration representing nearly half of the quantity of gum. Author also reports that the adulteration of another piece of gum, previously examined, consisted of calcite only in about the same amount.—*Anton Hogstad, Jr.*

1707. SCOVILLE, W. L. **Scammony and its substitutes.** Amer. Jour. Pharm. 91: 388–389. 1919.—A report on the examination of a sample of *Resina drastica,* a Mexican plant which closely resembles the Mexican Scammony, *Ipomoea orizabensis.* Examination of the *Resina* resin disclosed the fact that this product is far different from the resin of Mexican Scammony. A comparison is given of the resin of Scammony, resin of Mexican Scammony and the resin of *Resina drastica,* in tabulated form. (Reprinted from Jour. Ind. and Engin. Chem., April, 1919.)—*Anton Hogstad, Jr.*

1708. HOLMES, E. M. **Strophanthus semina, B. P.** Amer. Jour. Pharm. 91: 248–250. 1919.—Author sets forth the danger involved in the use of the preparations of Strophanthus seeds owing to the admixture of other seeds with the crude drug, and states that, in case of such powerful drugs as *Strophanthus, aconite* and *Digitalis,* the Foods and Drugs Act should be strictly applied to punish those using adulterated or mixed samples, or that a government inspector of vegetable drugs should be appointed to prevent such important remedies, if adulterated or diluted with other species, from entering commerce. A discussion of similar dangers regarding aconite follows, with the suggestion that the tincture of *Aconitum Napellus* should be prepared from the fresh plant, grown in Great Britain and collected in May. (Reprinted from Pharm. Journ. Pharmacist, Jan., 1919.)—*Anton Hogstad, Jr.*

1709. Farwell, Oliver A. **Cramp bark, highbush cranberry.** Northwestern Druggist 27: 245–246. 1919.—The commercial history of the drug Cramp bark is given and it is shown that no substitution of mountain maple bark for that of highbush cranberry was ever made but that, on the other hand, the mountain maple bark, from the very earliest times down to 1913, was the only commercial Cramp bark known. The opinion is expressed that the name Cramp bark, because of long years of use and commercial application, should be retained for the bark of *Acer spicatum* Lam. and the more familiar name of highbush cranberry should be adopted for the bark of *Viburnum Americanum* Mill. The paper is concluded by a letter from John Uri Lloyd, giving a detailed account of how the early Eclectics obtained their drugs through special collectors rather than from the commercial drug markets of the country, and presenting other remarks covering the Cramp bark and highbush cranberry subject.—*Oliver A. Farwell.*

1710. Bruntz, L. **Apropos de la presence des spores de Tilletia Tritici dans les sellss. [The presence of the spores of Tilleta Tritici in stools.]** Bull. Sci. Pharm. 26: 257–265. *Fig. 1.* 1919.—Feces containing the spores were found. The spores apparently had been introduced into the stomach by spoiled bread or flour, and had passed unchanged into the intestinal tract. The spores can easily be distinguished from pollen grains and the eggs of helminths. Whether or not they are detrimental to man has not been established as yet.—*H. Engelhardt.*

PLANT CHEMISTRY

1711. Anonymous (R. Wz.). [Rev. of: Hug [Enrique, L. J. A.] **Le Cestum Parqui (Duraznillo negro); étude de propriétés physiologiques. [Cestum Parqui (Duraznillo negro). A study of its physiological properties.]** Thesis for the degree of doctor of veterinary medicine, University of Buenos Aires. Bossio and Bigliani, publishers, Buenos Aires, 1918.] Bull. Sci. Pharm. 26: 340. 1919.

1712. Babington, F. W., Alfred Tingle, and C. E. Watson. **The examination of commercial dextrin and related starch products.** Amer. Jour. Pharm. 91: 50–53. 1919.—Method for determining the amount of dextrin gum in a mixture of starch and dextrin gum, the starch being estimated by difference. A suggested method for examination of starch products is given which will meet most commercial requirements.—*Anton Hogstad, Jr.*

1713. Bourquelot, Em., and M. Bridel. **Application de la méthode biochimique à l'étude de plusieurs espéces d'Orchidées indigénes. Découverte d'un glucoside nouveau, la loroglossine. [Application of the biochemical method to the study of various species of native orchids. Discovery of a new glucoside, Loroglossin.]** Jour. Pharm. et Chim. 20: 81. 1919.

1714. Bourquelot, Em., and H. Hérissey. **Application de la méthode biochimique à l'étude des feuilles fraiches d'Hakea laurina. Extraction de québrachite et d'arbutine. [The biochemical method applied to the study of the fresh leaves of Hakea laurina. Extraction of quebrachit and arbutin.]** Jour. Pharm. et Chim. 19: 251–255. 1919.

1715. Bridel, M. Marc. **Application de la méthode biochimique aux rameaux et aux ecorces de diverses especes du genre Populus. [Application of the biochemical method to the branches and barks of various species of the genus Populus.]** Jour. Pharm. et Chim. 19: 429–434; 20: 14–23. 1919.

1716. Castro, R. de. **Propiedades medicinales del jugo del platanero. [Medicinal properties of the juice of the plantain.]** Revist. Agric. Com. y Trab. 2: 63–64. 1919.—Compilation of medicinal uses of the juice of the leaves and stems of the banana or plantain.—*F. M. Blodgett.*

1717. Crossley, T. Linsey. **Melting point of rosin.** Amer. Jour. Pharm. 91: 183-185. 1919.—A comparison of the "film," "capillary" and "column" methods for the determination of the melting point of rosin, with directions for each method. The results show, as the authors state, that, properly speaking, rosin, like asphalt, has no definite melting point, therefore, any specification aiming to grade it by reference to its behavior on heating should state the method for obtaining results. (Reprinted from Jour. Indust. and Engin. Chem., January, 1919.)—*Anton Hogstad, Jr.*

1718. DeThouars, G. O. A. **Aqua Laurocerasi uit vesschillende variëteiten van Prunus Lauracerasus. [Cherry-laurel water made from different varieties of Prunus laurocerasus.]** Pharm. Weekblad 56: 790. 1919.—The author found the statements of Bridel, Juillet and Wester, that the young leaves contain the largest amount of hydrocyanic acid, correct, but he further found that the quantity of acid varies considerably with the different species of cherry-laurel. Thus, common *laurocerasus* contains 0.7 per cent; *l. Schipkaensis*, 1.46 per cent; *l. Schipkaensis Zabeliana*, 0.61 per cent; *l. Schipkaensis Michiana*, 0.62 per cent; *l. Schipkaensis Serbica*, 1.08 per cent; *l. Caucasica*, 1.05 per cent; *l. Colchica*, 1.36 per cent; *l. latifolia Bertini*, 0.7 per cent; and *l. rotundifolia*, 1.2 per cent.—*H. Engelhardt.*

1719. Dox, Arthur W., and G. P. Plaisance. **A new method for the determination of vanillin in vanilla extract.** Amer. Jour. Pharm. 91: 167–170. 1919.—A brief résumé of the various methods for the determination of vanillin, with an account of the use of thiobarbituric acid in the presence of 12 per cent of hydrochloric acid for this purpose. In summarizing the authors state "Thiobarbituric acid, which is easily prepared from malonic ester and thiourea, may be used for the quantitative determination of vanillin in vanilla extracts which do not contain caramel as added coloring matter. When caramel is present it may easily be detected by the brown precipitate formed on the addition of phloroglucinol to the clarified extract containing 12 per cent of hydrochloric acid. (Reprinted from Simmon's Spice Mill, November, 1918.)—*Anton Hogstad, Jr.*

1720. Findlay, Dorothy F. **An iodine factory in eastern Siberia.** Amer. Jour. Pharn. 91: 245–248. 1919.—An interesting account of a visit to a little iodine factory about 200 miles from Vladivostok. The author describes in a popular manner a tour through the factory where iodine is manufactured along simplest possible lines. "Chinese junks go out and rake in the seaweed, which is carried up to the top of the beach, stacked in piles, and burnt on the spot, at a stone's throw from the factory. The ash is wheeled straight into the tanks, lixiviated with the water in the usual way." There are many points of interest as to villagers, methods of transportation, etc. (Reprinted from the Pharm. Journ. and Pharmacist, Jan., 1919.)—*Anton Hogstad, Jr.*

1721. Gérardin, E. **Le Ladanum appelé aussi Ambre noir et Baume noir. [Ladanum also called black amber and black balsam.]** Bull. Sci. Pharm. 26: 289–297. 1919.—Data on the origin of the drug, the etymology of its name, the chemical composition of the balsam, an account of the substances used for adulterating the drug and of the use of the balsam, are given.—*H. Engelhardt.*

1722. Jacobson, C. A. **Alfalf saponin. Alfalf investigation VII.** Jour. Amer. Chem. Soc. 41: 640–648. 1919. [See Bot. Absts. 3, Entry 1223.]

1723. Koch, George P. **The influence of the presence of stems and roots upon the total alkaloid content of the leaves of stramonium.** Amer. Jour. Pharm. 91: 11–16. 1919.—In order to determine the possibilities and advisabilities of utilizing the stems and roots of stramonium in conjunction with the leaves, the author sets forth the results of his experiments in a series of 4 tables, which, briefly summarized, are as follows: (1) Moisture determinations of various parts of the plant: Leaves, 80–85 per cent; secondary stems, 87–92 per cent; primary stems, 85–87 per cent; roots, 78–82 per cent. (2) Relation of the leaf to that of stems: 47.5–52.5 per cent. (3) Relation of the leaf to that of stems and roots: 41 per cent. (4) Total alkaloid

content of various parts and the results produced when various percentages of stems and roots were added to the leaves: Leaf and secondary stems or leaves with 10 per cent of secondary stems are much higher than the required U. S. P. content. That the whole plant, with or without the root, can be used for a commercial preparation that will meet the desired standard of 0.25 per cent of total stramonium alkaloids.—*Anton Hogstad, Jr.*

1724. Lynn, E. V. **Ozonides and peroxides of the terpenes as therapeutic agents.** Jour. Amer. Pharm. Assoc. **8**: 103–104. 1919.—The view that oxygenated constituents of the volatile oils are the bearers of therapeutic properties, whereas the terpenes are regarded as mere diluents and hence of little value, has been shattered by a study of the products resulting from the oxidation of the terpenes with either atmospheric oxygen or ozone. The products of the action of ozone on the terpenes are termed ozonides and those resulting from the action of atmospheric oxygen on unsaturated hydrocarbons are called peroxides. Emphasis is placed on the necessity for further study of the chemical products that result from the initial addition of oxygen to the terpenes and the subsequent rearrangements of the labile oxides, both ozonides and peroxides.—*Anton Hogstad, Jr.*

1725. Lynn, E. V. **Camphene in hemlock oil.** Jour. Amer. Pharm. Assoc. **8**: 104. 1919. —Brief report on the identification of camphene in hemlock oil, the identity of which was established by converting it into borneol, m.p. 204°, by the Bertram-Walbaum hydration reaction.—*Anton Hogstad, Jr.*

1726. Miller, E. R., and E. V. Lynn. **Oleoresin of Pinus ponderosa.** Jour. Amer. Pharm. Assoc. **8**: 103. 1919.—A preliminary note on the examination of the oil obtained from the oleoresin of *Pinus ponderosa* by steam fractionation, to determine its constituents as well as to isolate the nopinene. Results to be reported elsewhere.—*Anton Hogstad, Jr.*

1727. Partridge, William. **Note on the assay of red Cinchona bark.** Amer. Jour. Pharm. **91**: 382–383. 1919. [Reprinted from The Analyst, March, 1919.]—Author reports that unsatisfactory results have been obtained in the assay of *Cinchonae rubrae cortex B. P.*, 1914, and suggests that there be a reduction in the amount of water used, making it 12 mils of water instead of 22 mils for the 10 grams of powdered drug. By using this proportion of water, higher contents of total alkaloids were obtained on three occasions, the increases being respectively 2.02, 1.16 and 1.46 per cent above the amounts found when pharmacopoeial instructions were followed.—*Anton Hogstad, Jr.*

1728. Phillips, Max. **An unusual oil from Monarda punctata.** Jour. Amer. Pharm. Assoc. **8**: 177–179. 1919.—The oil contains hydrothymoquinone and the plant resembles Monarda fistulosa in its phyto-chemical constituents.—*Anton Hogstad, Jr.*

1729. Phillips, Max. **The Volatile oil of Canada balsam.** Jour. Amer. Pharm. Assoc. **8**: 175–179. 1919.—A preliminary investigation of the volatile oil of Canada balsam, in which the presence of pinene has been confirmed. There is at least one other terpene present, as indicated by the boiling-points of certain fractions and by the benzylamine base of the fraction obtained at 173–178°C.—*Anton Hogstad, Jr.*

1730. Posternak, S. **Sur deux sels crystallisés du principe phospho-organique de réserve des plantes vertes. [Two phospho-organic salts in the reserve of green plants.]** Compt. Rend. Acad. Sci. Paris **168**: 1216–1219. *1 fig.* 1919.

1731. Power, Frederick B., and Victor K. Chesnut. **Ilex vomitoria as a native source of caffeine.** Jour. Amer. Chem. Soc. **41**: 1307–1312. 1919.—*Ilex vomitoria* contains a large amount of caffeine and no other North American species of *Ilex* contains this substance; nor is it found in the European holly (*Ilex aquifolium* Linné.).—*J. M. Brannon.*

1732. Schaefer, Hugo H. **Some variations in Cinchona bark and its preparations.** Jour. Amer. Pharm. Assoc. **8**: 11–13. 1919.—Report on the examination of several Cinchona barks, samples of fluid extracts of cinchona and tinctures of cinchona, which meet the requirement

for total alkaloid content of U. S. Pharmacopoeia IX but which fail to meet the ether-soluble requirement of U. S. P. VIII, thereby showing a deficiency in quinine content. Author voices the opinion that it would be much better to have requirements for both total and ether-soluble alkaloids for cinchona and its preparations.—*Anton Hogstad, Jr.*

1733. Wakeman, Nellie. **Teaching plant chemistry.** Jour. Amer. Pharm. Assoc. 8: 105–108. 1919.—See Bot. Absts. 3, Entry 922.

1734. Wunschendorff, H. E. **L'huile de fenugrec. [Oil of fenugreek.]** Jour. Pharm. et de Chim. 19: 397. 1919.—In addition to a volatile oil, fenugreek contains 7 per cent of a golden-yellow, drying, fatty oil which is soluble in all proportions in ether, petroleum ether and carbon disulphide but incompletely soluble in absolute alcohol and acetone. Chemical and physical constants are given.—*H. Engelhardt.*

POISONOUS PLANTS AND INSECTICIDES

1735. Hoffman, J. A. **Mercurialis poisoning in horses.** Berliner Tierarzt. Wochenschr. [through Pharm. Jour. 102: 426. 1919].—The question of Mercurialis poisoning was discussed by the author in 1918, when he described 8 cases of horses which had eaten hay containing great quantities of *Mercurialis annua.* The animals were affected in varying degrees; two recovered in three days; two others after 2 and 3 weeks, respectively. One of the eight died in 24 hours with symptoms of acute colic. Mercurialis preserves its toxicity even when dried. Some animals show a strange predisposition to the toxic action of the plant; others are much more resistant. According to Schulz, the toxic principle is mercurialin, which acts upon the muscles and the nerves of the intestine and the bladder, and also upon the heart. The red tint of the urine is attributed to an indigo-red pigment contained in the plant.—*E. N. Gathercoal.*

1736. Lewin, Louis. **Pfeilgifte und Pfeilgiftwirkungen. [Arrow poisons and their effects.]** Naturwiss. 7: 181–186. 1919.—A condensed account is given of over 40 years' study of this group of poisons, mostly of plant origin. The poisons are considered as they affect the animal system; first, local inflammatory poisons, then those that cause general symptoms of poisoning, these last being divided into (a) respiratory poisons, (b) heart poisons, (c) those producing cramps, and (d) those producing paralysis.—*Orton L. Clark.*

1737. Roark, R. C. **Plants used as insecticides.** Amer. Jour. Pharm. 91: 25–37, 91–107. 1919.—A contribution from the Insecticide and Fungicide Laboratory, Miscellaneous Division, Bureau of Chemistry, U. S. Department of Agriculture, Washington, D. C., calling the attention of entomologists, pharmacists and others to some 175 plants that might be utilized as insecticides to replace the arsenicals, pyrethrum (insect powder) and others. The author also states some possible uses of these, assuming no responsibility for the statements but merely quoting from various authors, with the hope that some of the plants listed may be found to be of commercial value as insecticides.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. Duggar, *Editor*

PROTOPLASM, MOTILITY

1738. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. 6: 273–300. 1919.—See Bot. Absts. 3, Entries 1934, 2133.

1739. Knudsen, L. **Viability of detached root-cap cells.** Amer. Jour. Bot. 6: 309–310. 1919.—Contrary to the prevailing belief that root-cap cells die as they are sloughed off, the author finds that in corn and Canada field peas grown in water cultures these cells, dropping off and collecting on the bottom of the culture vessels, remain alive for a long period (45 to 50 days or more).—*E. W. Sinnott.*

1740. Weber, Friedl. Die Plasmaviskosität pflanzlicher Zellen. [Review of recent work on the viscosity of the protoplasm of plant cells.] Zeitschr. Allg. Physiol. (Referate) 18[1]: 1–20. 1918.—Two methods of determining the viscosity of protoplasm are described. The viscosity of the protoplasm of the starch-sheath cells of *Vicia faba* is 23 times that of pure water. The viscosity decreases with rising temperature, the temperature coefficient being the same as for albumen, lying between 1.51 and 1.27. At extremely high temperatures a decided increase in viscosity occurs ("Wärmestarre"). One to 5 per cent ether decreases the viscosity, 5 to 10 per cent increases it. Small amounts of aluminium salts markedly increase the viscosity. Long immersion of sections in water decreases the viscosity, which rises near the time of death. Wounding increases the viscosity. Mechanical shaking decreases the viscosity, stronger or longer continued shaking increases it. A discussion of the relation of the influence of gravity on viscosity and geoperception is given.—*William J. Robbins.*

WATER RELATIONS

1741. Sayre, J. D. Comparative transpiration of tobacco and mullein. Ohio Jour. Sci. 19: 422–426. 1919.—In this preliminary paper the following conclusions are given: Mullein leaves offer greater resistance to water-loss in darkness than in light, and less in wind than in still air. They are as responsive to environmental changes as tobacco leaves. The removal of the hairs from mullein leaves affects cuticular transpiration only. In the course of a day, water-loss is first accelerated by the increased diffusion gradient through the opened stomata. At midday this becomes counterbalanced by leaf-water deficit and decreasing stomatal pores. Eventually the diffusion gradient decreases and the night rate is reached before the stomata are fully closed. Autonomic transpirational rhythm was observed in certain cases when plants were left in darkness for a day. The conditions controlling this rhythm are described. [See also next following Entry, 1742.]—*H. D. Hooker, Jr.*

1742. Sayre, J. D. Factors controlling variations in the rate of transpiration. Ohio Jour. Sci. 19: 491–509. *Fig. 1–9.* 1919.—Experiments to determine the factors controlling transpiration and its rhythm in darkness in *Verbascum thapsus* and *Nicotiana* sp. are described. Temperature and humidity were recorded by a hygrothermograph, checked by a psychrometer. Evaporation rates were determined by porous-cup atmometers. Transeau's automatically recording apparatus was used to determine rates of water-loss from the plants. The size of the stomatal pores was measured by Lloyd's method, after fixation in absolute alcohol. Transpiration at night is entirely cuticular. The day rate is controlled by the following factors: stomata, leaf-water deficit, and diffusion gradient. These factors combine to give a rounded curve. Tobacco and mullein show a rhythm in the transpiration curve in total darkness on a day following normal light conditions. This is absent on the second day, and was not found on the first day in *Verbascum blattaria.* The cause of the rhythm is thought to be stomatal activity. [See also next preceding Entry, 1741.]—*H. D. Hooker, Jr.*

MINERAL NUTRIENTS

1743. Miller, H. G. Relation of sulphates to plant growth and composition. Jour. Agric. Res. 17: 87–102. *Pl. 9–12.* 1919.—See Bot. Absts. 3, Entry 1770.

PHOTOSYNTHESIS

1744. Spoehr, H. A. The carbohydrate economy of cacti. Carnegie Inst. Washington [D. C.] Publ. 287. *79 p., fig. 1–2.* 1919.—Sugars are the first products that accumulate in the process of photosynthesis of carbon compounds and are considered the starting point for the synthesis of other compounds in all living matter. The tissues of cacti behave like masses of gels composed largely of colloidal carbohydrates among which are large quantities of pentosans. Organic compounds containing hydroxyl groups (e. g., carbohydrates) are very weak acids and while the sugars are stable substances, their salts decompose very readily, resulting

in mixtures of great complexity. The cleavage products are unstable and highly reactive. Many reactions take place giving a large number of substances in varying amounts depending on the concentration of sugar, temperature, oxygen supply, etc. With ample water supply and O_2 the hexoses are burned so that there is no accumulation of end products. The organic acids found in succulents are the accumulating intermediate or end products of catabolism. These organic acids break down easily in sunlight, i. e., split off CO_2. Joints of *Opuntia versicolor* and *O. phaeacantha* were the material used. The work consists largely of analyses of these plants taken under a variety of external conditions and subjected to a number of experimental conditions. Owing to the mucilaginous character of the material special methods of analysis were necessary, and serious errors were found in existing methods applied to plant material. The material must be quickly dried in order to destroy at once all enzyme actions which by the usual methods of drying are greatly accelerated for some time by the heat before the material is killed. One per cent HCl for hydrolysis proved best. This completely hydrolyzes polysaccharides, its effect on cellulose is slight, much less than other mineral acids. In making alcohol extractions it is exceedingly important that the plant acids be neutralized with $CaCO_3$, the addition of alkalies, e. g., NH_4OH as commonly used, leading to molecular rearrangements. A study of various methods of determining pentoses showed that these were open to serious sources of error and can be determined with accuracy only after removal of hexoses by fermentation. A special method was devised for use with alkaline copper solutions for all reducing sugars. Soxhlet's modification of Fehling's solution was used throughout. Reduction is carried out under precise conditions in a centrifuge tube of special design graduated on neck and provided with glass stopper. After reduction is completed, the tube is cooled and the solution made up to volume and thoroughly mixed. The tube is then centrifuged, which results in the compact sedimentation of all CuO and foreign matter. The supernatant liquid is perfectly clear and the remaining Cu can be accurately determined by means of the thiosulfate method according to Peters (Jour. Amer. Chem. Soc. 34: 928–954; 422–454. 1912). Analyses embrace dry weight, total sugars, total polysaccharides, total hexose sugars, hexose polysaccharides, disaccharides, monosaccharides, hexoses, total pentose sugars, pentosans, pentoses, cellulose, ash, and some micro-chemical tests on starch formation and consumption. From these data conditions of equilibrium of the various components are determined. Starch could not be determined by taka-distaase because of the protective action of the mucilaginous substances. Rate of emission of CO_2 was determined by absorption of CO_2 in standard $Ba(OH)_2$ solution and titrating unchanged base with standard HCl solution, using methyl orange. Joints 4 to 6 of cactus were hermetically sealed in a light-proof desiccator provided with entrance and exit tubes, which was immersed in a thermostat. CO_2-free air was drawn through the apparatus by an electric pump, pressure being regulated by a Palladin regulator for 4 to 12 hours and the stream of air could be passed through a fresh tube without interrupting the experiment. Individual plants show considerable variation in all components depending upon their location and environmental conditions. The major portion of the carbohydrates is present as polysaccharides, mainly as starch and a mucilaginous substance of pentosan nature. Results of analyses of *O. versicolor* and *O. phaeacantha* gave fairly comparable results, with the total carbohydrate content, and generally that of each constituent, higher in the last named species.—The following individual sugars were identified: l-xylose, d-glucose, fructose, saccharose, also glucuronic acid in small amount. The mucilaginous substances which play an important physiological rôle were obtained by extraction with water filtered through fine silk repeatedly, and precipitated with alcohol and dried. It was found by hydrolysis to contain 34.1 per cent d-glucose and 65.9 per cent l-xylose, and a small amount of ash. It has an enormous water holding power, though this does not prevent transpiration. The following seasonal variations in carbohydrate content were observed. Low water content and high temperature are associated with: (1) increase of polysaccharides; (2) decrease of monosaccharides; (3) increase of pentosans. High water content and low temperature with: (1) decrease of polysaccharides; (2) increase of monosaccharides; (3) decrease of pentosans. The greatest activity of the plant comes at the time when the content of mono- and disaccharides is highest, and a supply of simple sugars above that required for the normal respiratory activity seems

to be one of the factors necessary for growth. Series of experiments in which either the temperature or water conditions were altered show that low water content and high temperature affect the carbohydrate equilibrium in the same direction, and in reverse manner as related to high water content and low temperature, as just indicated.—In dry seasons loss of water and resultant need of water by the plant causes condensations of monosaccharides and disaccharides into polysaccharides and pentosans. Water is also formed by oxidation of simple sugars in respiration. Simple sugars quickly disappear when the plant undergoes natural or artificial slow desiccation. These plants can continue to live for a long time without water or formation of food and with but slight change in the per cent of water. These plants were kept at 28°C. in the dark for 189 days, they lost over 60 per cent in weight, and the water-content was reduced by but 12 per cent. The carbohydrate metabolism under these conditions is also treated.—The nocturnal respiration of cacti is characterized by the formation of acids due to restricted oxygen supply. No accumulation of alcohol was found during the night but a distinct increase was observed after the plants had been exposed to sunlight for some time, probably due to disintegration of malic acid:

$$COOH \cdot CH_2 \cdot CHOH \cdot COOH \rightarrow 2\ CO_2 + CH_3 \cdot CH_2OH$$

Under anaerobic conditions there is a very active production of alcohol but little acid formation in cacti. Under these conditions there is also higher rate of carbohydrate consumption and water formation than in air. The plants do not go into a condition of dormancy when the water supply is greatly diminished, but continue their normal respiratory activity, this being possible by virtue of their ability to use as food material not only the simple monosaccharides but also the polysaccharides, and results in the formation of pentosans. The simpler sugars, or monosaccharides, decrease in amount in the plants as the water content is reduced, and, vice versa, an increase in water supply results in a relative increase in these sugars. Pentosan formation is also dependent upon the water-content of the plant. With continued low water content the pentosans increase decidedly, whereas an ample supply of water results in the reduction of the amount of pentosans. In the aldose monosaccharides the first carbon atom, or the carbonyl group (CH:O), is the most reactive and is largely responsible for the great reactivity of these sugars. In the disaccharides and polysaccharides found in these plants this active carbonyl group is so united with other groups that it no longer forms the point of attack in chemical reaction. These sugars are therefore first affected on the opposite end of the chain of carbon atoms, at the CH_2OH group. Such a reaction results in a primary formation of glucuronic acid, $CH:O \cdot (CH \cdot OH)_4COOH$. This substance has been found as a product of carbohydrate metabolism in animals, usually in the conjugated form. It has now also been found in the extract of cacti, though only in very small amounts. Its presence is especially significant in that it indicates the mode of pentose formation in these plants. A very general property of acids of this character is the loss of CO_2 in the sunlight, and conversion into the corresponding lower aldehyde. In this manner glucuronic acid would form l-xylose. Neuberg (Ergebnisse d. Physiol. **3**: 373. 1904) has actually obtained l-xylose from glucuronic acid by bacteriological methods. Further evidence in favor of this interpretation of the formation of pentoses is obtained from the consideration of the structural relations of the various sugars concerned. If the pentoses were derived from the direct oxidation of the hexoses, d-glucose would yield d-arabinose, and d-galactose would give d-xylose. It is a striking fact, however, that d-glucose has almost always been found together with l-xylose, and d-galactose associated with l-arabinose. This is precisely what would be demanded by the theory of the intermediate formation of glucuronic acid.—*J. M. McGee.*

METABOLISM (NITROGEN RELATIONS)

1745. Fosse, R. **Le mécanisme de la formation artificielle de l'urée par oxydation et la synthèse des principes naturels chez les végétaux. [The mechanism of artificial formation of urea and the synthesis of substances in plants.]** Compt. Rend. Acad. Sci. Paris **168**: 1164–1166. 1919.—The author finds that formaldehyde and hydrocyanic acid are intermediate products in the formation of urea. It is suggested that there may be some relation between the synthesis of urea and the synthesis of glucose in plants.—*V. H. Young.*

1746. Gatin, C.-L. La maturation artificielle des fruits. [Artificial ripening of fruit.] Jour. Agric. Tropic. 19: 256–260. 1919.—A brief review of the work of other investigators relative to the chemical changes taking place in the ripening of fruit, and of means devised for artificially ripening such fruit as the Japanese persimmon.—*J. D. Luckett.*

1747. Heyl, Frederick W. The yellow coloring substances of ragweed pollen. Jour. Amer. Chem. Soc. 41: 1285–1289. 1919.

1748. Lewis, C. O. Premature deterioration of fruit. Better Fruit 13[1]: 5–7. Jan., 1919. —See Bot. Absts. 3, Entry 1642.

1749. Power, Frederick B., and Victor K. Chesnut. Ilex vomitoria as a native source of caffeine. Jour. Amer. Chem. Soc. 41: 1307–1312. 1919.—See Bot. Absts. 3, Entry 1731.

1750. Beijerinck, M. W. The significance of the tubercle bacteria of the Papilionaceae for the host plant. Proc. Roy. Acad. Sci. Amsterdam 21: 183–192. 1918. [Also published under: De beteekenis van de bakteriën der Papilionaceën knolletjes voor de voedsterplant. Versl. K. Akad. Wetenschappen Amsterdam 26: 1456–1465. 1918.]—The author attempts to discredit the view that *Bacillus radicicola* either grown free or in nodules fixes nitrogen, and offers the hypothesis that the bacteria are only indirectly concerned, the implication being that the protoplasm of the host plant is the catalyst responsible for the fixation. The evidence is, in part, admittedly circumstantial. *Robinia pseudo-acacia* has few and small nodules, yet the author believes that much atmospheric nitrogen is fixed, and therefore the fixation by the few nodules must be at an enormous rate or else the nitrogen is fixed by the host plant.—Scarcity of nodules is reported for such shrubs as *Sarothamnus vulgaris, Spartium scoparium, Genista anglica,* and *Genista pilosa* growing in unfertile soils, and the author considers this as evidence for the fixation of nitrogen by the host.—Experimentally, the author reports no nitrogen fixation by the free bacteria. Fixation experiments were made with 100 grams to 1000 grams of nodules of yellow lupine. These were placed in wide glass tubes and kept from 12 to 20 days and then gas analyses made. Evidence for nitrogen fixation was obtained neither in this experiment nor when nodules on roots attached to portions of the stem were used.—Experiments were also made using 15 grams of nodules of *Robinia pseudo-acacia* and 10 to 20 grams of nodules of *Vicia faba* with like results.—*L. Knudson.*

1751. Blanck. [Rev. of Blanck, E. Beiträge zum bakteriologisch-chemischen Umsatz der Milcheiweissstoffe, insbesondere Galalith, im Boden. (Contribution on the bacteriological chemical exchange on proteins of milk, especially galalith, in soils.) Landw. Versuchsst. 90: 17. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 283–284. 1918.—See Bot. Absts. 3, Entry 1796.

1752. Spitzer, George, R. H. Carr, and W. F. Epple. Soft corn—its chemical composition and nitrogen distribution. Jour. Amer. Chem. Soc. 41: 1212–1221. 1919.—The authors found the nitrogen content not greatly affected by the degree of maturity of soft maize. Considerable of the nitrogen is present as amide, and it seems to be formed at the expense of the zein. Glutelin seems to be the most abundant protein, zein next, and globulin last. "The amide or non-protein nitrogen content and the acidity in soft, moldy corn are quite high." Amide nitrogen may be taken as a basis for determining the maturity of maize.—*J. M. Brannon.*

METABOLISM (ENZYMES, FERMENTATION)

1753. Meyerhof, Otto. Über den Zusammenhang von Atmung und Gärung. [On the connection between respiration and fermentation.] Naturwissenschaften 7: 253–259. 1919.—The hypothesis, based on Pfeffer's and Pflüger's understanding of intramolecular respiration, that all respiration starts with anaerobic changes, that the metabolic products largely occur as alcohol when oxygen is absent, while these are oxidized further to carbon dioxide and water

in the presence of oxygen, has been proved in the case of certain plants; but it does not hold true with the animal cells studied. With the exclusion of oxygen from these no alcohol or carbon dioxide is formed. On the other hand, if one assumes that lactic acid may be an intermediate product of fermentation, as Büchner now thinks, we may hold to the identity of intramolecular respiration and fermentation, since lactic acid is found as a product of respiration in the animal cell (muscle) under both aerobic and anaerobic conditions. Meyerhof then shows how the respiratory enzymes have been separated from the life of the cell much as have the enzymes of fermentation. Co-enzymes have also been discovered in respiration, these playing a part similar to that of the co-ferments in fermentation.—*Orton L. Clark.*

1754. Went, F. A. F. C. **On the course of the formation of diastase by Aspergillus niger.** Proc. Roy. Acad. Sci. Amsterdam 21: 479–493. 1919. [Transl. from Versl. K. Akad. Wetensch. Amsterdam 26 or 27: 1918.]—The paper is concerned with the amount of diastase present in the fungus and nutrient solution at varying ages of the culture. The nutrient solution was composed of 5 per cent glucose, 0.5 per cent NH_4NO_3, 0.1 per cent K_2HPO_4, and 0.05 per cent $MgSO_4$. The author finds that for the first few days after germination there is a very marked production of diastase in the mycelium, but after five days there follows a rapid destruction of the enzyme, Relatively little of the enzyme is found in the culture medium, and the author believes that this is derived from dead cells.—*L. Knudson.*

ORGANISM AS A WHOLE

1755. Pringsheim, Hans. **Die chemische Anpassung der Mikroorganismen.** [The chemical adaptation of the microörganisms.] Naturwissenschaften 7: 319–323. 1919.—The remarkable ability of microörganisms to use as food practically all the substances occurring in nature is discussed. Pringsheim then notes how the more complex molecular organic compounds and their final decomposition products, which approach the elementary state, are used in the nutrition of only a few highly specialized microörganisms; while the substances which are intermediate in the breaking down of the carbohydrate and protein molecules (i.e., the sugars and peptones) serve as food for a very large variety of microörganisms. Special cases of adaptation of microörganisms to the use of various types of carbohydrates and proteins are considered. Reference is also made to the rôle of enzymes of the yeast cells as well as to the use of the chemotactic reaction of the motile microörganisms as a test of the food value of certain racemic substances for the organism.—*Orton L. Clark.*

GROWTH, DEVELOPMENT, REPRODUCTION

1756. Lewis, C. I. **Some interesting phases of the pruning problem.** Better Fruit 13^8: 26–32. Feb., 1919.—See Bot. Absts. 3, Entry 1541.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1757. Alvarado, Salustio. **Sobre el verdadero significado del "sistema de fibrillas conductor de las excitaciones en las plantas" de Nemec. (Un dato para la historia del condrioma vegetal.) [True significance of Nemec's system of filaments for conducting stimuli in plants.]** Bol. R. Soc. Española Hist. Nat. 19: 147–152. *Fig. 1–2.* 1919.

TEMPERATURE RELATIONS

1758. Emeis. W. **Eine weitere Erklärung zur Bildung von Haareis auf morschem Holz [A further explanation of the formation of hair-ice on decayed wood.]** Naturwissenschaften 7: 124. 1919.—The appearance of this curious formation is due not to the coöperation of fungi as Wegener held, but to purely physical causes. The decayed wood is usually saturated with water and at low temperatures the water expands in the vessels and freezes in hair-like spindles as it exudes from them.—*Orton L. Clark.*

TOXIC AGENTS

1759. RITZEMA BOS, J. Bijdrage tot de kennis van de werking der bordeauxsche pap op de aardappleplant. [A contribution to the knowledge of the action of Bordeaux mixture on the potato plant.] Tijdschr. Plantenz. 25: 77–94. 1919.—See Bot. Absts. 3, Entry 1654.

MISCELLANEOUS

1760. ALVARADO, SALUSTIO. La fina estructura de los vasos leñosos. (Nota previa.) [Minute structure of wood vessels.] Bol. R. Soc. Española Hist. Nat. 19: 66–75. *Fig. 1–7.* 1919.—See Bot. Absts. 3, Entry 1567.

1761. BARSS, H. P. Prune troubles of non-parasitic nature. Better Fruit 13[1]: 7–8, 24–26 Jan., 1919.—See Bot. Absts. 3, Entry 1625.

1762. VAN DER LEK, H. A. A. Ouer de z. g. "verwelkingsziekten," in het bijzonder die welke door Verticillium alboatrum veroorzaakt worden. [Regarding the so-called wilt diseases especially those caused by Verticillium alboatrum.] Tijdschr. Plantenz. 24: 205–219. *Pl. 4 fig. 1–3.* 1918. *Ibid.* 25: 17–52. *Pl. 1–3, fig. 1–4.* 1919.—See Bot. Absts. 3, Entry 1666.

SOIL SCIENCE

J. J. SKINNER, *Editor*

GENERAL

1763. BEAUMONT, A. B. Studies in the reversibility of the colloidal condition of soils. Cornell Univ. Agric. Exp. Sta. Mem. 21: 480–524. 1919.—The author holds that soil colloidality is dependent to a considerable degree upon circumstances and environment. The colloidal condition of a soil is constantly changing being especially susceptible to moisture variations. Wetting and drying in its effect upon colloidal conditions is therefore the particular phase set forth in the present study.—In discussing the modern conceptions or reversibility as related to colloidal materials the author agrees with Oswald that the change is not determined in the main by the nature of the colloid itself but by the conditions that produce coagulation. The term reversibility as generally used, that is to indicate a change from the colloidal to non-colloidal state and vice versa, is found too narrow from the soil standpoint and is broadened to include the changes between the sol and gel states.—In reviewing the literature as to the effects of wetting and drying on soils, the physical changes which are set up seem in general to be correlated with increased fertility. Cohesion and plasticity for instance are generally reversed and most authorities attribute the commonly observed changes to alterations in the colloidality of the soil.—After an extended experimentation with methods the author selected three for use: (1) a modified Mitscherlich water-vapor-method, (2) a modification of Ashley's dye method and (3) the ordinary suspension procedure. The first two were used most extensively, the degree of hygroscopicity and the amount of dye absorbed being considered as relative measures of colloidal content. In general temperature variations below 10°C. did not noticeably affect water vapor absorption. Dyes were absorbed differently by soils according to the chemical character of the dye and the colloids present in the soil.—Hygroscopicity of soil was decreased by successive air-drying, oven-drying and ignition. The passage from the moist to air-dry state produced a greater colloidal change than from the air-dry to oven-dry condition. Ignition produced a marked effect although the hygroscopic values of some ignited soils were very high. Alternate wetting and drying had little effect upon surface soils after the first passage. Such action with subsoils was cumulative. Long immersion in water raised the hygroscopicity of a soil low in organic matter and lowered it in a soil rich thereof. Leaching seemed to increase the water vapor absorption of soils.—As the same general results were attained with the dye method of estimating colloidal content, the author concludes that the drying of a soil especially from the moist to

air-dry condition has a profound effect in reversing colloidal properties. The recovery from such a reversal is by no means immediate upon wetting but is comparatively slow. The influence of drying upon colloidal conditions seems to the author to be more or less indirect, the direct effects being produced by later chemical and biological actions.—*H. O. Buckman.*

1764. Lewis, C. I. **Correlation of orchard practices.** Better Fruit 13[9]: 17-22. *Tab. 1–8.* March, 1919. Nitrogen as sodium nitrate, applied at a rate of 3–5 pounds per tree proved to be best fertilizer for apples. Early spring application gave best results. [See Bot. Absts. 3, Entry 2341.]—*J. J. Skinner.*

1765. Lipman, C. B., and W. F. Gericke. **The inhibition by stable manure of the injurious effects of alkali salts in soils.** Soil Sci. 7: 105–120. 1919.—By pot experiments in the greenhouse, barnyard manure was found to reduce or eliminate the toxic action of sodium chloride, sodium sulfate or sodium carbonate on barley plants. Four successive crops were grown. The salts were tested singly at the rate of 0.3 per cent each for sodium chloride and sodium carbonate, and 0.6 per cent for sodium sulfate, based on the dry weight of the soil. Previous to the second planting additional quantities of the salts were added at the same rate. It should be feasible and profitable to offset the inhibiting effects of the salts in some of the alkali land of the west by use of barnyard manure or other form of organic matter.—*William J. Robbins.*

1766. Main, F. [Rev. of: Fauchère, A. **Guide pratique d'agriculture tropicale.** *159 p.* Paris. Augustinn Challmel, 1918.] Jour. Agric. Tropic. 19 (Bull. Bibliog.): 127. 1919.—See Bot. Absts. 3, Entry 1379.

1767. Metge, G. [Rev. of: Clausen. **Die Bodenausnutzung durch die Kartoffel bei kleinen und grossen Saatknollen und bei enger und weiter Pflanzenzweite. (Utilization of the soil by the use of large and small seed potato tubers and by close and wide spacing.)** Illustr. Landw. Zeitg. 37: 108–109. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 285. 1918. —See Bot. Absts. 3, Entry 1385.

1768. Metge, G. [Rev. of Lemmerman, O., and H. Wiessmann. **Über die Wirkung einer humosen Braunkohle als Konservierungsmittel für Jauche. (On the action of humus brown coal as a preservative for liquid manure.)** Mitteil. Deutsch. Landw. Ges. 32: 741–743. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 307–311. 1918.—Tests on the humus brown coal showed that it fixed 5.122 per cent of NH_3 while peat fixed only 1.981 per cent. Sixty per cent additions of the coal was found to conserve 50 to 60 per cent of strongly fermenting manure. In the (stable runnings) ('gauche') treated with brown coal the author found 4.41 grams of total nitrogen (in 500 cc. of the liquid) while in material not so treated he found only 0.375 grams of total nitrogen. For a cubic meter of liquid manure 2000 lbs. of brown coal is required. Experiments with beets using conserved liquid manure as a source of nitrogen compared favorable with similar experiments in which ammonium sulphate was used.—*F. M. Schertz.*

1769. Metge, G. [Rev. of: Wagner, P. **Wie wirkt die Saatgutbeschaffenheit auf den Kartoffelertrag unter dem Einfluss verschiedener Pflanzweite, Güngung and Jahreswitterung. (Influence of the seed stock on the yield of potatoes under the influence of different distance of planting, manuring and weather.)** Deutsch. Landw. Presse 45: 169, 175–176, 183. 1918.] Biedermann's Zentralbl. Agrikulturchem. 47: 325–333. 1918.—See Bot. Absts. 3, Entry 1386.

1770. Miller, H. G. **Relation of sulphates to plant growth and composition.** Jour. Agric. Res. 17: 87–102. *Pl. 9–12.* 1919.—Sodium sulphate, calcium sulphate and sulphur were added separately to beaver-dam, loam and clay-adobe soils. Red clover, oats and rape were grown in small pots of these treated soils in a greenhouse. The sulphur, together with calcium carbonate, was added to the soils when planting the seed. The sulphates were distributed by daily applications in solution. Nitrogen was supplied from a solution of sodium

nitrate. Other cultures were conducted in sand, with the addition of sterilized (boiled) extracts of the soils, together with nutrient salts.—Sulphur and sulphates enhanced growth. These effects in the sand cultures are attributed to direct effects of sulphur compounds upon the plants. Clover responded most, having increased nitrogen content and development of roots and nodules where sulphur and sulphates were applied. The latter effects are ascribed to stimulation of nitrogen-fixing bacteria. Alfalfa from field plots to which sulphur had been applied contained more nitrogen and organic compounds of sulphur than that from control plots. The former also contained inorganic sulphates, while the latter contained none.—*W. E. Tottingham.*

1771. PETHYBRIDGE, G. H. **Investigations on potato diseases.** Jour. Dept. Agric. Ireland **19**: 271–292. *Fig. 1–2.* 1919.

1772. PESCOTT, EDWARD E. **The Australian flora from an ornamental aspect.** Jour. Dept. Agric. Victoria **17**: 360–364. *Pl. 4.* 1919.—See Bot. Absts. 3, Entry 2279.

1773. PICKERING, SPENCER. **The action of one crop on another.** Jour. Roy. Hortic. Soc. **43**: 372–380. *Fig. 54–59.* 1919.—The author points out that the growth of plants in soil produces a toxic substance which appears to have a deleterious effect on vegetation. This condition is brought about by the decomposition of organic matter, and, since most of the organic matter comes from plant growth, it is natural to suppose that more toxin will be found where plants are growing than where they are not; thus the toxic effect of one plant on another. He goes on to point out that the toxic effect produced is only temporary and that the toxin is later changed into plant food.—The growth of grass around fruit trees produces a toxic effect which is detrimental to the trees. The effect varies under different conditions, but experiments indicate that the effect was independent of the age of the tree.—Heating the soil caused a temporary increase of toxicity, though the ultimate growth of plants in heated soil was greater. What the toxic substance is has not yet been ascertained, but it is not dihydroxystearic acid.—*J. A. Middleton.*

1774. POWERS, W. L. **The improvement of marsh lana in western Oregon.** Oregon Agric. Exp. Sta. Bull. 157. *32 p., fig. 1–24.* 1919.—Preliminary surveys indicate that drainage and improvement of most of Oregon's 150,000 acres of marsh land is entirely feasible. Materials, methods and costs for achieving such a result are given. Experiments and successful farming operations in various parts of the state have demonstrated the great value of the land already drained.—*E. J. Kraus.*

1775. SHUTT, FRANK T. **The "alkali" content of soils as related to crop growth.** Agric. Gaz. Canada **6**: 8–15. 1919.—The results of the analysis of five series of soil groups are recorded, each series consisting of three groups representative of land upon which (1) there was good growth, (2) there was poor growth, the crop being distressed by alkali and (3) there was no growth, due to excess of alkali. The crops studied were western rye grass, native prairie grass, oats, wheat and onions. Soil samples were taken at various intervals to the depth of 5 feet. The per cent of sodium sulphate, magnesium sulphate, calcium sulphate, sodium carbonate, and the total soluble saline content was determined for each sample. The western rye grass soil series was impregnated with white alkali, the chief constituent being sodium sulphate and the limits of toxicity where growth took place, ranged from 0.117 to 0.980 per cent depending on the depth of sampling. Native prairie grass showed some growth in much heavier concentration ranging from 0.432 to 1.662 per cent. In the wheat series, the limit of tolerance was indicated by a per cent of 0.123 in the first 6 inches of soil. Below that, the sodium sulphate increased rapidly to 0.701 per cent, and all root extension was inhibited. In the oat and onion series, the soil was heavily impregnated with black "Alkali," the characteristic salt of which is sodium carbonate. The concentration of this salt was greater on the surface soil and decreased steadily in the lower samples. The limit of toxicity seemed to be reached in oats at 0.212 per cent and in onions at 0.224 per cent. With the exception of the series upon which wheat was grown, the soils were under irrigation and were located in

Alberta, Saskatchewan, and British Columbia. The work reported is preliminary to the establishment of standards adapted to Canadian conditions, as regards safe limits of alkalinity in the growing of various crops.—*O. W. Dynes.*

1776. Williams, C. B. **Report of the division of agronomy.** North Carolina Agric. Exp. Sta. Ann. Rept. 41: 22–35. [1919.]—See Bot. Absts. 3, Entry 1415.

1777. Richter. [Rev. of: Seissl, Josef. **Die Phosphorsäure im geglühten Boden. (Phosphoric acid in ignited soils.)** Zeitschr. Landw. Versuchsw. in Österreich 20: 212. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 241–243. 1918.—The phosphoric acid content of the soils was determined both before and after ignition, to determine the relation of organic to inorganic phosphate. In 24 samples analyzed the ignited soils showed from 20 to 40 per cent more phosphoric acid than the unignited ones. The organic phosphoric acid was due to decomposing vegetation. Aso and Yoshida found that, for barley, peas and rape, the nutritive values of lecithin, phytin and nuclein were in this order, that of lecithin being greatest. Lecithin was not inferior to sodium phosphate, phytin was similar to iron or aluminium phosphate, while nuclein had the weakest action. The author favors the view that a certain amount of organic phosphorus compounds is taken up by the plant from the soil.—*F. M. Schertz.*

1778. Volhard, J. [Rev. of: Strell, M. **Neue Wege für die Verwendbarkeit von Abwasserklärschlamm als Düngemittel. (New ways for the application of waste-water clarification sediment as fertilizers.)** Landw. Versuchsst. 90: 257. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 311–313. 1918.—The author gives a historic review of the waste water question. Nitrogen and phosphoric acid in waste-water sediment are in a much less assimilable form than they are in ammonium sulphate, superphosphate and in fish meal. The above sediment is not suitable for plants which have a short growing period as potatoes. beets, and rutabagas. A much greater quantity of sediment must be used than commercial fertilizers. Moisture and additions of lime apparently increase the efficiency of the sediment. Natural sediment contains more moisture, more total nitrogen and more soluble nitrogen than the decreased sediment. The author presents a method for making more quickly available to the plant, the nitrogenous substances in the sediment. He studied the influence of humus substances upon the nitrification of the organic nitrogen compounds. In this connection "hawin," a black brown pasty mass obtained by treating brown coal with NaOH solution, was studied. It dissolves in water to form a deep brown colloidal solution, when 2 to 3 cc. of a 10 per cent solution of "hawin" and 1.5 cc. of a 10 per cent aluminum sulfate solution are added to a liter of water, coarse flocculent particles form at once and envelop the finest and apparently dissolved organic matter of the water and carry it to the bottom. "Hawin" solution was shown to have a favorable action upon the nitrifiability of organic nitrogen compounds and was especially favorable to the activity of the nitrite forming bacteria. Nitrates were demonstrated to be present in the filtrates of the "hawin" sediment but not in such constant quantities as the nitrites. The nitrification of organic nitrogen compounds such as are present in large amounts in waste-waters and in stable manures is decidedly accelerated by the admixture of humus-like substances. With additions of peat nitrification was slight.—*F. M. Schertz.*

FERTILIZATION

1779. Anonymous. **Las cenizas en el cultivo pratense. [Ashes for clover growing.]** La Informacion Agric. [Madrid] 9: 204. 1919.—See Bot. Absts. 3, Entry 1331.

1780. Anonymous. **Molasses as a fertilizer for cane land.** Australian Sugar Jour. 11: 200. 1919.—Results appear to indicate that the application of molasses has given an increased yield of 3.7 tons of cane per acre.—*E. Koch.*

1781. BROWN, GORDON G. **Experiments with nitrate of soda as a fertilizer for orchards in the Hood River Valley, Oregon.** Proc. Oregon Hortic. Soc. 1918: 107–112. 1919.—See Bot. Absts. 3, Entry 2318.

1782. BROWN, G. G. **Fertilizer tests for strawberries.** Oregon Agric. Exp. Sta. Bull. 159. *15 p., 2 fig.* 1919.—A three-year test gave varying results when nitrate of soda, superphosphate, or sulfate of potash were used as fertilizers, either singly or in combination. In general the use of clover as a green manure resulted in increased yields. The application of nitrate of soda also increased yields, but it must be used with moderation. Mineral fertilizers can not be depended upon wholly to replace those containing large quantities of organic matter. On the lighter more open soils the latter types of fertilizers are indispensable. The kinds and amounts of fertilizers to be employed must be judged from strictly local conditions. —*E. J. Kraus.*

1783. METGE, G. [Rev. of: CLAUSEN. **Das Kalk- und Kalibedürfnis der Hülsenfrüchte. (Lime and potash requirements for the legumes.)** Illustr. Landw. Zeitg. 37: 547–549. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 313–318. 1918.—In general the yield of leguminous crops is increased by additions of lime and potash. Tables are given showing the yield from various fertilizer treatments (phosphoric acid, potash, and nitrate) on different types of soil.—Thomas slag, kainit, and ammonium sulphate were some of the fertilizing materials used.—*F. M. Schertz.*

1784. CRUZ, JOSE. **El abonado de la remolacha. [Fertilization of the sugar beet.]** Informacion Agric. [Madrid] 9: 171–173. 1919.—For every hundred kilograms of sugar produced fourteen kilograms of mineral salts are drawn from the soil, and chemical fertilizers are needed to supply these elements. A series of experiments with sodium nitrate indicated that average soils require 50 to 100 kgm. per hectare and up to 500 for poorer soils, an excess lowering the sugar content of the beets and the purity of the juice.—*John A. Stevenson.*

1785. DOMINGO, M. GIL. **El empleo de abonas quimicas en los naranjas. [Chemical fertilizers for oranges.]** Informacion Agric. [Madrid] 9: 60–61. 1919.—See Bot. Absts. 3, Entry 2328.

1786. GUZMANES, ANTONIO. **El abono del pimiento. [Fertilization of the pepper.]** Informacion Agric. [Madrid] 9: 191–192. 1919.—War made the importation of guano difficult and chemical fertilizers were substituted in Spain. The average yield obtained with peppers (20,000 to 25.000 kgm. per hectare) required 400 kgm. of sodium nitrate and 500 of superphosphate or equivalent. Potash was desirable but unobtainable.—[See Bot. Absts. 3, Entry 2387.] *John A. Stevenson.*

1787. MCCOOL, M. M., G. N. GRANTHAM, AND C. E. MILLAR. **Some information and suggestions concerning the use of phosphorus.** Michigan Agric. Exp. Sta. Bull. 284. *30 p. 21 fig.* 1919.—A discussion of the phosphorus needs of Michigan soils as demonstrated by fertilizer experiments with and without phosphorus in different parts of the state. It is recommended that this element be applied to sand, loam, clay and muck soils when experiments show an absence of sufficient phosphorus.—*E. A. Bessey.*

1788. MURRAY, J. C. **Molasses as a fertilizer.** Australian Sugar Jour. 11: 189. 1919.—Reports success in the use of molasses as a fertilizer in Australia.—*E. Koch.*

1789. RICHTER. [Rev. of: GREISENEGGER, IGNAZ K. **Versuch mit Samenrüben unter Verwendung von Mangansulfat als Katakytischem Dünger. (Experiments on seed beets using manganese sulfate as a catalytic manure.)** Oesterreich-Ungar. Zeitschr. Zuckerindust. und Landw. 1917: 13, 1917.] Biedermann's Zentralbl. Agrikurchem. 47: 320–324. 1918.

1790. Schatzlein. [Rev. of· Sidenius, E. **Düngungsversuche zu Tabak 1915 bis 1916. (Fertilizer experiments on tobacco, 1915–1916.)** Mededeel. Proefstat. Vorstenlandsche Tabak 26: 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 318–320. 1918.—Ammonium sulphate in tobacco culture gave good results. Six grams per plant gave 17.6 per cent, 10 grams gave 15.3 per cent and 16 grams 21.4 per cent increase. The quality was better and the leaves were longer than in tobacco grown in unfertilized soil. The burning was affected detrimentally to only a very slight degree. The poor burning quality of tobacco grown on fields fertilized with barnyard manure at Kebon-Argoon is ascribed to the chlorine content of the manure. Experiments conducted in other regions of Java have generally given similar results. —*F. M. Schertz.*

1791. Skinner, J. J., and C. F. Noll. **The botanical composition of a permanent pasture as influenced by fertilizers of different compositions.** Soil Sci. 7: 161–179. 1919.—The yield of hay, lime requirement of the soil and botanical composition of the hay from a 6 year fertilizer experiment with grass on Hagerstown loam is reported. The fertilizers used were acid phosphate, sodium nitrate and potassium chloride. Each fertilizer was used alone and in combination of 2's and 3's, the ingredients varying by 10 per cent stages according to a triangular diagram. The yield of hay was greatest on those plots fertilized with mixtures high in nitrogen. Plots receiving mixtures of acid phosphate and potassium chloride, but no sodium nitrate, show the highest lime requirement. The original composition of the vegetation was Canada blue grass, Kentucky blue grass and white and red clover. At the end of 7 years Kentucky blue grass has become predominent. Clover has been crowded out of plots receiving high ratios of nitrogen, the largest amount of clover occurring in the no-nitrogen series of plots.—*William J. Robbins.*

1792. Volhard, J. [Rev. of: Pfeiffer, Th., and W. Simmermacher. **Über die Wirkung des Dicyandiamids auf das Pflanzenwachstum. (The action of dicyandiamide on the growth of plants.)** Landw. Versuchsst. 90: 415–430. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 243–246. 1918.—The germination of oats is not affected by considerable quantities of dicyandiamide but the growth of the plants and the yield of the grain are seriously injured. The quantity of dicyandiamide found in crude calcium cyanamide is quite small but the substance should be considered as an impurity that may possibly have an injurious effect on the crops.—*F. M. Schertz.*

FERTILIZER RESOURCES

1793. Anonymous. **El precio de los abonos quimicos. [Price of chemical fertilizers.]** Informacion Agric. [Madrid] 9: 97–98. 1919.—Prices and stock on hand in France are compared with conditions in Spain.—*John A. Stevenson.*

1794. Anonymous. **Nuevo procedimiento de obtencion artificial de sales potasicas. [New methods for obtaining potash salts artificially.]** Informacion Agric. [Madrid] 9: 145–146. 1919.—An account of the new methods devised in the United States and Great Britain for obtaining potash from smelter and cement plant waste.—*John A. Stevenson.*

1795. Blanck. [Rev. of: Blanck, E. **Der Phonolith ein Stickstoffdünger. (Is phonolith a nitrogenous fertilizer?)** Landw. Versuchsst. 90: 33. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 283. 1918.

1796. Blanck. [Rev. of: Blanck, E. **Beiträge zum bakteriologisch-chemischen Umsatz der Milcheiweissstoffe, insbesondere Galalith, im Boden. (Contribution on the bacteriological-chemical exchange of milk proteins, especially galalith, in soils.)** Landw. Versuchsst. 90: 17. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 283–284, 1918.—A very favorable result is reported by using galalith as a source of nitrogen for field crops. Experiments on the decomposition of protein of galalith (a by-product of milk) were carried out in a sandy soil. No nitrification of the split off ammonia was observed. The galalith served as a constant source of nitrogen for the growing plants.—*F. M. Schertz.*

1797. de Castella, F. **Potash manures—sulphate or muriate?** Jour. Dept. Agric. Victoria 17: 369–370. 1919.—A discussion of the relative efficiency of the sulphate and chloride of potash for agricultural purposes. The sulphate is concluded to be the best.—*J. J. Skinner.*

1798. Gavilan, Juan. **Nitrato de sosa de Chile.** [Chilean nitrate.] Informacion Agric. [Madrid] 9: 25–29. *5 figs.* 1919.—An account of the exploitation of the Chilean nitrate deposits. A resumé of experiments with the salt is given showing increased yields of cereals, alfalfa, olives, grapes, and onions.—*John A. Stevenson.*

1799. Metge, G. [Rev. of: Popp, M. **Düngungsversuche mit verdorbenem Kalkstickstoff.** (Research on fertilizing with damaged crude calcium cyanamide.) Mitteil. Deutsch. Landw. Ges. 32: 776–780. 1918.] Biedermann's Zentralbl. Agrikulturchem. 47: 299–307. 1918.—The author shows that the injurious action of old calcium cyanamide is due to the dicyandiamide set free. The calcium cyanamide takes up water and is decomposed into dicyandiamide and urea or ammonia. The author carried out pot experiments on moor soil with old and fresh calcium cyanamide, ammonium chloride, ammonium sulphate, urea, urea nitrate and other nitrogenous substances. The review contains the results of a series of experiments on the growth of oats in potted moor soil which had been variously treated. The old or dicyandiamide-rich calcium cyanamide gave a higher nitrogen content in the oats straw. Two series of garden experiments also were carried out in the year 1916, using potatoes. Plots with calcium cyanamide gave only little better yield than untreated plots. Urea nitrate gave the most favorable yield with the "Gertrude" variety, while urea gave a higher yield with "Roode Staar." In experiments with cabbage the presence of dicyandiamide caused the edges of the leaves to become white and very clearly injured the growth. [See also next following Entry, 1800.]—*T. M. Schertz.*

1800. Müller, B. [Rev. of: Meyer. **Die Lagerung von Kalkstickstoff in Säcken.** (Storage of crude calcium cyanamide in bags.) Illustr. Landw. Zeitg. 58: 347. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 286–287. 1918.—Calcium cyanamide in storage takes up moisture and carbon dioxide from the atmosphere whereby the weight and volume increases, the material hardens and sticks together. Decomposition sets in and a considerable quantity of dicyandiamide is formed. The calcium cyanamide must not be stored in jute sacks, for the alkali in the fertilizer affects the sacks and, further, the taking up of water and carbon dioxide causes the fertilizer to expand and burst the sacks. When stored in paper or jute sacks, in 8 weeks the increase in weight was 10.9 per cent, and in 21 weeks 11.7 per cent.—Calcium cyanamide from the outer layer of the sack showed 10.93 per cent of nitrogen while samples from the middle showed 14.31 per cent. The outer layer increased 36.1 per cent in weight while the middle increased 4.0 per cent; 7.9 per cent of the outer layer had changed into dicyandiamide while in the middle 3.5 per cent had so changed. Decomposition was greater during the warmer months. Storage in a heap is recommended, in a dry place, the pile being covered with Thomas slag, layers of dry fertilizer sacks or dry peat. [See also next preceding Entry, 1799.]—*F. M. Schertz.*

SOIL CLASSIFICATION

1801. Blanck. [Rev. of: von Horváth, Béla. **Über die Einteilung der Böden nach ihrer elektrischen Leitfähigkeit.** (Classification of soils according to their electrical conductivity.) Internat. Mitteil. Bodenk. 6: 231. 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 283. 1918.—Conductivities of soils were compared with the soil types. For several reasons classification of the soils by their conductivity is questioned.—*F. M. Schertz.*

1802. Tores, Francisco. **Clasificacion de los terrenos.** [Classification of soils.] Informacion Agric. [Madrid] 9: 105. 1919.—Soils are classified as sandy, calcareous, clay, loam, and saline. The natural vegetation occurring on each type in Spain is given, together with the fertilizing elements required by various cultivated crops.—*John A. Stevenson.*

NITRIFICATION

1803. Greaves, J. E., and E. G. Carter. **Action of some common soil amendments.** Soil Sci. 7: 121–160. 1919.—To tumblers each containing 100 g. of soil and 2 per cent of dried blood, the chlorides, carbonates, and nitrates of sodium, potassium, calcium, magnesium, manganese, and iron, and the sulfates of calcium, magnesium, manganese and iron, were added singly in amounts which had been found to produce the maximum nitrification and ammonification. After 21 days incubation the water-soluble phosphorus and the organic phosphorus were determined. Many of the above salts increased the water soluble phosphorus, the organic phosphorus or both. The increased crop growth noted from the use of the above soil amendments can be accounted for by the increase in available nitrogen or phosphorus.—*William J. Robbins.*

1804. Metge, G. [Rev. of: Kuhn, A. **Über die Impfung von Getreide, Hackfrüchten und anderen Kulturpflanzen mit "U-Kulturen." (The inoculation of cereals, etc.)** [Deitsch. Landw. Presse 44: 467–468. 1917.] Biedermann's Zentralbl. Agrikulturchem 47: 261–263. 1918.—The author claims that his product *U Kulturen* (Universal-Kulturen) gave favorable results in field experiments. The product is a mixed culture intended for use on non-leguminous plants.—*F. M. Schertz.*

1805. Volhard, J. [Rev. of: Arnd, Th. **Über die Entstehungsweise salpeter- und salpetrigsaurer Salze in Moorböden. (The origin of potassium nitrate and nitric acid in moor soils.)** Landw. Jahrb. 51: 297–328. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 291–294. 1918.—The author reviews the works of Ritter in regard to the origin of nitrates in soils. He made qualitative tests, before and after inoculation of sterilized soils, for NH_3, KNO_3 and HNO_3. Nitrates do not arise alone from chemical reactions in the soil but in general nitroso- and nitro-bacteria give rise to them. The author emphasizes need of further work on the activity of soil bacteria.—*F. M. Schertz.*

1806. Volhard, J. [Rev. of: Münter, F. **Über Sorption und Nitrifikation von Ammonverbindungen bei Gegenwart von Zeolithen im Boden, sowie über Ammoniakbestimmungen im Boden und über zeolithartige Substanzen. (On the absorption and nitrification of ammonia compounds in the soil when zeolite is present, also estimation of ammonia and zeolite substances in the soil.)** [Landw. Versuchsst. 90: 147. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 289–291. 1918.—Some authors ascribe the absorption of ammonia salts in the soil to zeolite which was present only in small amounts. Experiments were conducted by adding zeolite (1–2 per cent) to the soil. Nitrogen compounds were then added in the form of corn meal or ammonium sulphate. Ammonification and nitrification in a sandy soil with zeolite corresponded to that in a clay soil. Author also estimated the ammonia present in the soils. By direct distillation of the soil, ammonia was not set free without decomposing nitrogenous bodies in the soil. The greatest differences were found when distillation took place with magnesium oxide and potassium chloride. Absorption then must be conditioned by other substances than zeolite. It was further shown that the differences did not depend upon denitrification, for total nitrogen estimations showed that no nitrogen was lost. The author also worked on zeolite and its related compounds. The capacity of soils for combination with ammonia salts seems to be closely related to the colloidal state.—*F. M. Schertz.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

GENERAL

1807. Adamson, R. S. Notes on the flora of northern Cheshire. Jour. Botany 57: 91–94. 1919.—The result of excursions during the last three years. A long list of rarities is given, with many notes as to their occurrence.—*K. M. Wiegand.*

1808. Chase, Agnes. Some causes of confusion in plant names. Jour. Forestry 17: 159–162. 1919.—Two causes are ascribed to the differences in plant names; first, the difference between the early and the present day concepts of a genus; second, the relative isolation of the workers. The present system of basing names on priority and basing the genus on a type species is doing much to bring harmony.—*E. N. Munns.*

1809. Hayata, Bunzō. Icones plantarum Formosanarum nec non et contributiones ad floram Formosanam. [Illustrations of plants of Formosa and also contributions to the flora of Formosa.] *Roy. 8vo. Vol. VIII, p. 1–164, pl. I–XV.* Bureau of Productive Industries: Taihoku, March 25, 1919.—The present volume contains the results of further investigations on the flora of Formosa, and includes the descriptions of 111 new species and 17 new varieties of flowering plants and ferns, distributed among several families, chiefly in the Compositae, Rutaceae, Labiatae, Urticaceae, and Polypodiaceae.—*J. M. Greenman.*

1810. Hill, Albert Frederick. Vascular flora of the Penobscot Bay region. Proc. Portland Soc. Nat. Hist. 3: 199–304. *6 fig., 1 map.* 1919.—A statement of the "general features of the region" precedes an enumeration of the vascular plants collected. A total of 747 species, varieties, and forms are recorded for the region concerned and 612 of these are indigenous and 135 are introduced plants. The author then follows with a discussion of the "phytogeographical aspects of the flora."—*J. M. Greenman.*

1811. Holmberg, Otto R. En ny handbok i Skandinaviens flora. [A prospective Scandinavian flora.] Bot. Notiser 1918: 306–308. 1918.—A notice and description of a prospective new flora of Scandinavia.—*P. A. Rydberg.*

1812. Schaffner, John H. Additions to the catalog of Ohio vascular plants for 1918. Ohio Jour. Sci. 19: 293–298. 1919.—This annual list includes 88 species.—*H. D. Hooker, Jr.*

1813. Vuillemin, Paul. Les principes de la classification botanique. [The principles of botanical classification.] Compt. Rend. Acad. Sci. Paris 167: 449–453. 1918.

1814. Vuillemin, Paul. Classification des Dicotyledones. Haplogones. [Classification of the dicotyledons. Haplogones.] Compt. Rend. Acad. Sci. Paris 167: 477–481. 1918.

1815. Vuillemin, Paul. Classification des Dicotyledones. Anthogones. [Classification of the dicotyledons. Anthogones.] Compt. Rend. Acad. Sci. Paris 167: 510–514. 1918.

PTERIDOPHYTES

1816. Anonymous. Large ebony spleenworts. Amer. Bot. 25: 60, 1919.—Specimens of *Asplenium ebeneum* more than 25 inches long are recorded.—*W. N. Clute.*

1817. de Barnola, P. J. Las Licopodiales de la Peninsula Iberica citas y notas criticas. [The Lycopodiales of the Iberian Peninsula with citations and critical notes.] Broteria Ser. Bot. 17: 17–27. 1919.

1818. Farr, C. H. The ferns of the rain-forest. Sci. Monthly 9: 19–31. *30 fig.* 1919.

1819. Hayata, Bunzô. **Protomarattia, a new genus of Marattiaceae, and Archangiopteris.** Bot. Gaz. 67: 84–92. *1 pl., 3 text fig.* 1919.—*Protomarattia tonkinensis* is described and illustrated as a new genus and species of the Marattiaceae, from Monte Tamdao (Tonkin), China. Four species of *Archangiopteris* are recognized namely, *A. subintegra*, *A. tamdaoensis* Hayata, spp. nov. and *A. Henryi* Christ from China, also *A. Somai* Hayata from Formosa. [See Bot. Absts. 3, Entry 1283.]—*J. M. Greenman.*

1820. Maxon, W. R. **A new Cheilanthes from Mexico.** Proc. Biol. Soc. Washington 32: 111–112. 1919.—*Cheilanthes castanea* Maxon is described as a new species.—*J. C. Gilman.*

1821. Maxon, W. R. **A new Alsophila from Guatemala and Vera Cruz.** Proc. Biol. Soc. Washington 32: 125–126. 1919.—*Alsophila scabriuscula* Maxon is described as a new species from Alta Verapaz, Guatemala, and Vera Cruz.—*J. C. Gilman.*

SPERMATOPHYTES

1822. Abrams, L. R. **A new California cypress.** Torreya 19: 92. 1919.—The note describes *Cupressus nevadensis* sp. nov. This was first discovered by Mrs. Polkinghorn on Red Hill, Piute Mts., near Bodfish, Kern Co., Cal., in 1907, and was again collected by the author in 1915. Its closest relationship is to *C. Sargentii* Jepson.—*J. C. Nelson.*

1823. Blake, S. F. **Revision of Ichthyomethia, a genus of plants used for poisoning fish.** Jour. Washington [D. C.] Acad. Sci. 9: 241–252. 1919.—The trees of this genus are of economic importance among the natives of tropical America who use the bark of the root to poison fish. The timber is also valuable. This paper describes the eight known species of the genus, substituting, in harmony with the American Code of Botanical Nomenclature, the name *Ichthyomethia* for *Piscidia.* Three of the described species are new, and several new combinations have been made.—*Helen M. Gilkey.*

1824. Britton, N. L., and J. N. Rose. **The Cactaceae, descriptions and illustrations of plants of the cactus family.** Vol. 1. Carnegie Inst. Washington [D. C.] Publ. 248. 24 × 30 *cm., vii + 236 p., 36 plates (mostly colored), 301 fig.* August, 1919.—This is the first volume of a monograph of the Cactaceae which is being prepared through a cooperation of the Carnegie Institution of Washington, the New York Botanical Garden, the U. S. National Museum and the U. S. Department of Agriculture. The monograph is to include the results of special exploration and is to give special attention to habitat and relations to other species. The present volume deals with the Pereskieae and Opuntieae. Illustrations are very numerous, both photographs and drawings.—*B. E. Livingston.*

1825. Detmers, Freda. **Two new varieties of Acer rubrum L.** Ohio Jour. Sci. 19: 235–239. *Pl.* 12–13. 1919.—Two trees found on Cranberry Island, Buckeye Lake, Ohio, are designated as *Acer rubrum* L. var. *viride* and *Acer rubrum* L. var. *rubrocarpum.* Detailed descriptions of each variety are given and a key to the section *Rubra* of the genus *Acer* in the United States is appended.—*H. D. Hooker, Jr.*

1826. Griffiths, David. **New and old species of Opuntia.** Bull. Torrey Bot. Club 46: 195–206. *Pl. 9–10.* 1919.—The following new species of *Opuntia* are described: *O. effulgia*, *O. cyanea*, *O. diversispina*, *O. hispanica*, *O. chata*, *O. Maideni*, *O. obovata*, *O. amarilla.* Two species of the same genus, *O. Bartrami* Raf. and *O. maritima* Raf. are "recognized for the first time since originally described."—*P. A. Munz.*

1827. Hedlund, T. **Upprop. [A request].** Bot. Notiser 1919: 103–104. 1919.—Mr. Hedlung requests Swedish botanists to corroborate by field study his contention that the cultivated *Ribes rubrum* L. is really a native of Sweden, and as common in the wild state as any other of the Swedish species of red currants, and should retain its usual name *R. rubrum.* Janczewski has claimed that it is not a native of Sweden and that the name *R. rubrum*, under which Linnaeus included several species, should be applied to a native species. He, therefore, applied it to *R. Schlechtendalii*, a treatment to which Mr. Hedlund objects.—*P. A. Rydberg.*

1828. HITCHCOCK, A. S. A peculiar species of Lasiacis. Jour. Washington [D. C.] Acad. Sci. 9: 35–38. 1919.—The genus *Lasiacis*, belonging to the tribe Paniceae, includes 13 species of grasses of tropical and semi-tropical America. All specimens from Trinidad, the lower Orinoco, and eastern Brazil, studied by the author, were found to possess a second sterile lemma in addition to the usual sterile lemma characteristic of the tribe. In the possession of this character, the plants of this region differ from all other known specimens representing the genus, though in other respects they resemble *Lasiacis ruscifolia* (HBK.) Hitchc. & Chase (*Panicum compactum Swartz*) to which they were formerly referred. On the basis, therefore, of distinct geographical range and uniformity in the possession of a second sterile lemma, they are raised to specific rank under the name *Lasiacis anomala*.—*Helen M. Gilkey.*

1829. HOLMBERG, OTTO. Glyceria aquatica—en nomenculturefråga. [Glyceria aquatica. A question of nomenclature.] Bot. Notiser 1919: 95–98. 1919.—According to the author, the plant usually known as *Glyceria aquatica* (L.) Wahl. 1820 (not *G. aquatica* (L.) Presl) should be known as *Glyceria maxima* (Hartm.) Holmberg, n. comb., and the one usually known as *Catabrosa aquatica*, if included in *Glyceria*, should become *Glyceria dulcis* (Salisb.) Holmberg.—*P. A. Rydberg.*

1830. LAM, H. J. The Verbenaceae of the Malayan Archipelago, together with those from the Malayan Peninsula, the Philippines, the Bismarck Archipelago, and the Palau, Marianne, and Caroline Islands. *8 vo. 370 p., 3 pl.* M. de Waal: Groningen, 1919.—A monographic treatment of the family for the area covered with descriptions, keys to the genera and species, and citation of specimens. Twenty-eight genera are recognized, of which Viticipremna and Xerocarpa are proposed as new. Numerous new species are described in the following genera: *Guensia* (1), *Callicarpa* (1), *Xerocarpa* (1); *Premna* (12), *Vitex* (2), *Gmelina* (3), *Faradaya* (2) and *Clerodendron* (4). New names and new combinations appear in various genera.—*E. D. Merrill.*

1831. LINDSTRÖM, A. A. Om slägtet Rosa. Bot. Notiser 1919: 149–151. 1919.—The author suggests a double set of characters to be used artificially in determining the species of *Rosa*. First, whether the base of the leaflets is broad, *i.e.* rounded, truncate, or cordate, or narrow, *i.e.* cuneate or tapering. Secondly, whether the teeth are directed forward and usually incurved, or salient. By combining the two sets of characters, four types of leaflets are recognized, which he denotes by the Greek letters α, β, γ, and ζ.—*P. A. Rydberg.*

1832. MORVILLEZ, F. L'appareil conducteur des feuilles des Saxifragacées. [The conducting organs of the leaves of the Saxifragaceae.] Compt. Rend. Acad. Sci. Paris 167: 555–558. *1 fig.* 1919.—See Bot. Absts. 2, Entry 71.

1833. PIPER, C. V. New Pacific Coast plants. Proc. Biol. Soc. Washington [D. C.] 32: 41–44. 1919.—The following plants found in western United States are described as new species: *Sidalcea Nelsoniana*, *Cryptantha suffruticosa*, *Stachys caurina*, *Stachys confertiflora*, *Pentstemon deserticola*, *Cirsium oreganum*, *Stachys ciliata macrantha* is described as a new subspecies from British Columbia.—*J. C. Gilman.*

1834. PLEIJEL, CARL. Valeriana excelsa Poir. X officinalis L. nova hybrida. [Swedish with diagnosis in Latin.] Bot. Notiser 1918: 295–296. *Fig. 1–3.* 1918.—*P. A. Rydberg.*

1835. ROWLEE, W. W. Synopsis of the genus Ochroma, with descriptions of new species. Jour. Washington [D. C.] Acad. Sci. 9: 157–167. 1919.—The wood of *Ochroma*, commonly called "balsa wood," has become widely known during the past few years through its utilization for war purposes. Its light weight has fitted it for use in life-boats, life-rafts, and aeroplanes. The results of seven months' study in Central America where the author was sent to investigate the quality and quantity of balsa wood, are set forth in this paper. Nine species are described, 7 new species added to the 2 previously known. Balsa is a conspicuous tree of tropical America, sometimes occurring as isolated individuals in forests but more often as abundant second growth in clearings. It is one of the most rapid-growing trees known.—*Helen M. Gilkey.*

1836. Safford, W. E. **Notes on the genus Dahlia with descriptions of two new species from Guatemala.** Jour. Washington [D. C.] Acad. Sci. 9: 364–373. *4 pl., fig. 1–4.* 1919.—The genus *Dahlia* should be carefully revised with the work based upon material collected in Mexico and Central America, where these plants are endemic, rather than upon garden-grown material as heretofore. Specimens recently collected in those regions throw new light upon the origin of many of our garden forms, while illustrations made in 1575 by a Spanish explorer indicate that "double-flowered" dahlias are normal and not the creation of modern horticulturalists from "single-flowered" types, as generally supposed. The new species proposed in this paper are: *Dahlia Popenovii* and *D. Maxonii.*—*Helen M. Gilkey.*

1837. Sargent, C. S. **Notes on North American Trees. IV.** Bot. Gaz. 67: 208–242. 1919.—The present article contains critical notes and distributional data on several species of trees, new combinations, and descriptions of new species, varieties, and hybrids, as follows: *Picea glauca* var. *albertina* (*P. canadensis* var. *albertina* Rehder), *Juniperus utahensis* var. *megalocarpa* (*J. megalocarpa* Sudworth), *Populus tremuloides* var. *vancouveriana* (*P. vancouveriana* Trelease), *P. arizonica* (*P. mexicana* Sargent, not Wesmael), *P. arizonica* var. *Jonesii, P. Palmeri, P. texana, P. Fremontii* var. *Thornberii, P. Fremontii* var. *pubescens, P. Fremontii* var. *Toumeyi, P. Parryi* (*P. Fremontii* x *trichocarpa*), *Ostrya virginiana* var. *glandulosa, Betula Eastwoodae, B. commixta* (*B. alaskana* x *glandulosa*), *Celtis occidentalis* var. *canina* (*C. canina* Raf.), *C. reticulata* var. *vestita, C. laevigata* var. *Smallii, C. laevigata* var. *texana* (*C. texana* Scheele), *C. laevigata texana* f. *microphylla, C. laevigata* var. *brachyphylla, C. laevigata* var. *anomala, C. laevigata* var. *brevipes* (*C. brevipes* Wats.), *C. pumila* var. *georgiana* (*C. georgiana* Small), *C. pumila* var. *Deamii, Platanus occidentalis* f. *attenuata, P. occidentalis* var. *glabrata* (*P. glabrata* Fernald), *Magnolia virginiana* var. *australis, M. acuminata* var. *ludoviciana, Acer saccharum* var. *glaucum,* (*A. saccharinum* var. *glaucum* Pax), *A. saccharum* var. *sinuosum* (*A. sinuosum* Rehder), *A. rubrum Drummondii* f. *rotundata, A. Negundo* var. *texanum* f. *latifolium* (*A. Negundo* var. *latifolium* Pax), *A. Negundo* var. *interior* (*A. interior* Britton), *A. Negundo* var. *arizonicum, Fraxinus americana* var. *subcoriacea,* and *Castanea alnifolia* var. *floridana.*—*J. M. Greenman.*

1838. Schneider, Camillo. **Notes on American willows. III. A conspectus of American species and varieties of sections Reticulatae, Herbaceae, Ovalifoliae, and Glaucae.** Bot. Gaz. 67: 27–64. 1919.—Thirty-two species are included in the present consideration of the above sections. The enumeration and description of the sections and species is preceded by two keys —one to the female plants and one to the male plants. The following new species, varieties, and forms are characterized: *Salix nivalis* Hook. var. *saximontana, S. rotundifolia* Trautvetter forma *pilosiuscula, S. arctophila* Cock. var. *lejocarpa* (*S. groenlandica* var. *lejocarpa* Lange), *S. hudsonensis,* and *S. glauca* var. *acutifolia* (Hook.) Schn. forma *poliophylla.*—*J. M. Greenman.*

1839. Schneider, Camillo. **Notes on American willows. IV. Species and varieties of section Longifoliae.** Bot. Gaz. 67: 309–346. 1919.—The present paper deals with a distinctly American group of willows which are assembled under the sectional name *Longifoliae.* Eight species and eight varieties are recognized. The following are designated as new varieties or new combinations: *Salix exigua* Nutt. var. *nevadensis* (*S. nevadensis* Watson), *S. exigua* var. *luteosericea, S. exigua* var. *tenerrima* (*S. longifolia* var. *tenerrima* Henderson), *S. melanopsis* Nutt. var. *Bolanderiana* (*S. longifolia* Bebb, in part, not Muhl.), *S. longifolia* Muhl. var. *Wheeleri* (*S. interior* var. *Wheeleri* Rowlee).—*J. M. Greenman.*

1840. Stapf, Otto. **Gramineae.** Flora of Tropical Africa 9^3: 385–576. 1919.—This part concludes the account of Andropogoneae and commences that of the Paniceae, ending in the midst of *Paspalum.* *Digitaria* is a large genus with 49 species; *Alloteropsis* is based on *Panicum semialatum* R. Br. and includes *Coridochloa* Nees (distinct in the key to genera); *Pseudechinolaena* is based on *Echinolaena polystachya* HBK (*Panicum uncinatum* Raddi) and distinguished from *Echinolaena* (*E. inflexa* Chase, *E. hirta* Desv.); *Brachiaria,* distin-

guished by the secund spikelets adaxial on the rachis (abaxial in *Paspalum* and species of *Panicum* with racemose spikelets), and based on *B. cruciformis* (Sibth. & Smith) Griseb. (Stapf uses *B. Isachne* Stapf based on *Panicum Isachne* Roth), includes 56 species, among which are *B. mutica* (*Panicum muticum* Forsk., *P. numidianum* Lam., *P. barbinode* Trin.), called Para grass in America; *Axonopus* is based on *A. compressus* Beauv. (*Paspalum compressum* Rasp.); *Paspalum* includes only 5 species.

The new genera, species, and varieties of part 2, issued in 1918, and of the present part are as follows:

Part 2. *Schizachyrium nodulosum* (*Andropogon nodulosus* Hack.), *S. griseum*, *S. semiberbe* Nees var. *flocculiferum*, *S. semiberbe* Nees var. *hemileium* (*Andropogon hirtiflorus* Rendle, not Kunth), *S. ursulus*, *S. Jeffreysii* (*Andropogon Jeffreysii* Hack.), *S. Schweinfurthii* (*Andropogon Schweinfurthii* Hack.), *S. Thollonii* (*Andropogon Thollonii* Franch.), *S. compressum* (*Andropogon compressus* Stapf), *S. scintillans*, *S. pulchellum* (*Andropogon pulchellus* D. Don), *S. Kelleri* (*Andropogon Kelleri* Hack.), *S. rupestre* (*Andropogon rupestris* K. Schum.), *Andropogon Lima* (*Andropogon amethystinus* var. *Lima* Hack.), *A. pilosellus*, *A. homogamus*, *A. calvescens*, *A. Stolzii*, *A. purpureus*, *A. laxatus*, *A. laxatus var. ligulata*, *A. linearis*, *A. pseudapricus* (*Andropogon apricus* var. *africanus* Hack.), *A. amplectens* Nees var. *diversifolius* (*A. diversifolius* Rendle), *A. Dummeri*, *A. Dummeri* var. *calvus*, *A. Pseudo-Schinzii*, *A. canaliculatus* Schumach. var. *fastigians* and var. *Fyffei*, *A. tumidulus*, *A. Macleodiae*, *A. auriculatus*, *A. gayanus* Kunth var. *squamulatus* (*A. squamulatus* Hochst.), *A. macrophyllus*, *Cymbopogon proximus* (*Andropogon proximus* Hochst.), *C. floccosus* (*Andropogon floccosus* Schweinf.), *C. divaricatus*, *C. afronardus*, *C. validus* var. *lysocladus*, *C. excavatus* (*Andropogon excavatus* Hochst.), *C. densiflorus* (*Andropogon densiflorus* Steud.), *Hyparrhenia finitima* [Anderss. in Schweinf. Beitr. Fl. Aethop. 300, 306, 1867] (*Andropogon finitimus* Hochst.), *H. gazensis* (*Cymbopogon gazense* Rendle), *H. dichroa* (*Andropogon dichroos* Steud.), *H. rufa* (*Trachypogon rufus* Nees), *H. rufa* var. *major* (*Cymbopogon rufus* var. *major* Rendle), *H. altissima* (*Andropogon altissimus* Hochst.), *H. exarmata* (*Cymbopogon exarmatus* Stapf.), *H. poecilotricha* (*Andropogon poecilotrichus* Hack.), *H. vulpina*, *H. chrysargyrea* (*Cymbopogon chrysargyreus* Stapf), *H. Nyassae* (*Andropogon Nyassae* Rendle), *H. smithiana* (*Andropogon smithianus* Hook. f.), *H. hirta* (*Andropogon hirtus* L.), *H. soluta* (*Cymbopogon solutus* Stapf), *H. soluta* var. *violascens*, *H. bagirmica* (*Cymbopogon bagirmicus* Stapf), *H. grallata*, *H. Barteri* (*Andropogon Barteri* Hack.), *H. Barteri* var. *calvescens* (*Andropogon filipendulus* var. *B calvescens* Hack.), *H. filipendula* (*Andropogon filipendulus* Hochst.), *H. filipendula* var. *pilosa* (*Andropogon filipendulus* var. *pilosus* Hack.), *H. familiaris* (*Andropogon familiaris* Steud.), *H. macrolepis* (*Andropogon macrolepis* Hack.), *H. pseudocymbaria* [Anderss. 1856] (*Anthistiria pseudocymbaria* Steud.), *H. cymbaria* (*Andropogon cymbarium* L.), *H. variabilis*, *H. collina* (*Andropogon collinus* Pilger), *H. spectabilis*, *H. formosa*, *H. elongata*, *H. rudis*, *H. phyllopoda*, *H. arrhenobasis* (*Andropogon arrhenobasis* Hochst.), *H. Lintonii*, *H. cyanescens* (*Cymbopogon cyanescens* Stapf), *H. petiolata*, *H. confinis* var.? *pellita* (*Andropogon confinis* var. *pellitus* Hack.), *H. macrarrhena* (*Andropogon confinis* var. *macrarrhenus* Hack.), *H. Welwitschii* (*Cymbopogon Welwitschii* Rendle), *H. gracilescens*, *H. bracteata* (*Andropogon bracteatus* Humb. & Bonpl.), *H. Lecomtei* (*Andropogon Lecomtei* Franch.), *H. Newtonii* (*Andropogon Newtonii* Hack.) *H. Newtonii* var. *macra*, *H. Stolzii*, *H. cirrosula*, *H. subplumosa*, *H. diplandra* (*Andrapogon diplandrus* Hack.), *H. pachystachya*, *H. Gossweileri*, *H. glabriuscula* [Anderss. 1867] (*Andropogon glabriusculus* Hochst.), *H. andongensis* (*Cymbopogon andongensis* Rendle), *H. multiplex* var. *leiopoda*, *H. involucrata*, *H. notolasia*, *H. Cornucopiae* (*Andropogon Cornucopiae* Hack.), *H.* (?) *pusilla* (*Andropogon pusillus* Hook. f.), Dybowskia (new genus) *Serettii* (*Andropogon Dybowskii* Franch)

Part 3. Monocymbium (new genus) *ceresiiforme* (*Andropogon ceresiaeformis* Nees), *Anadelphia trepidaria* (*Andropogon trepidarius* Stapf), *A. leptocoma* (*Andropogon leptocomus* Trin.) *A. tenuifolia*, *A. longifolia*, *A. pubiglumis*, *A. hamata*, *A. arrecta* (*Andropogon arrectus* Stapf.), *A. afzeliana* (*Andropogon afzelianus* Rendle), *A. trispiculata*, Monium (new genus) *macrochaetum*, *Trachypogon Thollonii* (*T. polymorphus* var. *Thollonii* Franch.), T. *durus*, *T. planifolius*, Elymandra (new genus) *androphila* (*Andropogon androphilus* Stapf.), *Digi-*

taria milanjiana (*Panicum milanjianum* Rendle), *D. seriata, D. macroblephara* (*Panicum macroblepharum* Hack.), *D. Pearsonii, D. Perrottetii* (*Panicum Perrottetii* Kunth), *D. marginata* var. *Linkii* and var. *fimbriata* (*D. fimbriata* Link), *D. marginata* var. *nubica, D. acuminatissima, D. monodactyla* var. *explicata* (*Panicum monodactylum* Eyles), *D. compressa, D. nardifolia, D. capitipila, D. seminuda, D. pellita, D. Brazzae* (*Panicum Brazzae* Franch.), *D. Lecardii* (*Panicum sanguinale* var. *Lecardii* Pilg.), *D. xanthotricha* (*Panicum xanthotrichum* Hack.), *D. melanochila, D. delicatula, D. botryostachya, D. Hackelii* (*Panicum Hackelii* Pilg.), *D. leptorrhachis, D. polybotrya, D. nigritiana* (*Panicum nigritianum* Hack.), *D. maniculata, D. elegans, D. uniglumis* (*Panicum uniglume* A. Rich.), *D. uniglumis* var. *major, D. minutiflora* (*Panicum minutiflorum* A. Rich.), *D. Myurus, D. intecta, Alloteropsis semialata* Hitchc. var. *Ecklonii* (*Axonopus semialatus* var. *Ecklonii* Stapf), *A. angusta, A. paniculata* (*Urochloa paniculata* Benth.), *A. cimicina* (*Milium cimicinum* L.), *Microcalamus glaber, Pseudechinolaena polystachya* (*Echinolanea polystachya* HBK), *Eriochloa Macclounii, Leucophrys glomerata* (*Panicum glomeratum* Hack.), *Brachiaria obvoluta, B. dictyoneura* (*Panicum dictyoneuron* Fig. & DeNot.), *B. Rautanenii* (*Panicum Rautanenii* Hack.), *B. hians, B. viridula, B. filifolia, B. falcifera,* (*Panicum falciferum* Trin.), *B. fulva, B. brevis, B. soluta, B. stigmatisata* (*Panicum stigmatisatum* Mez), *B. brevispicata* (*Panicum brevispicatum* Rendle), *B. reticulata, B. interstipitata* (*Panicum interstipitatum* Stapf), *B. platytaenia, B. vittata, B. latifolia, B. mutica* (*Panicum muticum* Forsk.), *B. decumbens, B. rugulosa, B. distachyoides, B. dura, B. brizantha* (*Panicum brizanthum* Hochst.), *B. callopus* (*Panicum callopus* Pilg.), *B. obtusiflora* (*Panicum obtusiflorum* A. Rich.), *B. nigropedata* (*Panicum nigropedatum* Munro), *B. lachnantha* (*Panicum lachnanthum* Hochst.), *B. serrata* (*Panicum serratum* Spreng.), *B. serrata* var. *gossypina* (*Panicum gossypinum* A. Rich.), *B. brachylopha* (*Panicum brachylophum* Stapf.), *B. arida* (*Panicum aridum* Mez), *B. leucacrantha* (*Panicum leucacranthum* K. Schum.), *B. xantholeuca* (*Panicum xantholeucum* Hack.), *B. ramosa* (*Panicum ramosum* L.), *B. regularis* (*Panicum regulare* Nees), *B. ovalis* (*Panicum ovale* R. Br.), *B. grossa, B. serrifolia* (*Panicum serraefolium* Hochst.), *B. pubifolia* (*Panicum pubifolium* Mez), *B. glauca, B. leersioides* (*Panicum leersioides* Hochst.), *B. Isachne* (*Panicum Isachne* Roth), *B. poaeoides, B. epaleata, B. semiundulata* (*Panicum semiundulatum* Hochst.), *B. distichophylla* (*Panicum distichophyllum* Trin.), *B. kotschyana* (*Panicum kotschyanum* Hochst.), *B. andongensis* (*Panicum andongense* Rendle), *B. comata* (*Panicum comatum* Hochst.), *B. jubata* (*Panicum jubatum* Fig. & DeNot.), *Paspalum scrobiculatum* var. *Commersonii* (*Paspalum Commersonii* Lam.).—*A. S. Hitchcock.*

1841. Turesson, Göte. **Grupp—och artbegränsning innom slägtet Atriplex. [Limitations of the groups and species of the genus Atriplex.]** Bot. Notiser 1919: 41–47. 1919.—The North European species are placed in three groups, distinguished by the position and shape of the radicle. These groups are represented by, and cluster around, *A. patula, A. hastata,* and *A. rosea.* The leaf-form is of little value in the classification, and the shape and the more or less high union of the bracts are, according to the author, not very important. Classification is very difficult, as the species hybridize very readily.—*P. A. Rydberg.*

1842. Wright, C. H. **Disporum pullum var. brunnea.** Curtis's Bot. Mag. **15**: *Pl. 8807* (*colored*). 1919.—This new variety comes from western Hupeh, China. The perianth segments are purplish-brown, whence the varietal name, and stellately spreading at the tips.—*Oliver A. Farwell.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

Burton E. Livingston, *Editor*

1843. Ashe, A. **A new incandescent light for microscopical illumination.** Jour. Quekett Microsc. Club, II, **14**: 1–4. *1 fig.* 1919.—The light described is an adaptation of a small acetylene lamp and thoria discs or rolls of mantle material.—*Leva B. Walker.*

1844. C., A. H. [Rev. of: Bower, F. O. **Botany of the living plant.** *580 p. 8vo.* Macmillan & Co.] Jour. Botany **57**: 226–229. 1919.

1845. Coulter, John M. **The botanical opportunity.** Science 49: 363–367. April, 1919.—In this address, delivered before the meeting of the American Association for the Advancement of Science at Baltimore, the author calls attention to the necessity of carrying forward the progress which botany has made during the war, and of strengthening the spirit of cooperation which has developed under the stress of war. In connection with the period of reconstruction, a great opportunity has come to botany. A response to this opportunity for public service does not mean *less* science but *more* science. The history of botany shows that the science has been passing through the analytic phase, and the older botany, a term practically synonymous with taxonomy, has been split into a large number of divisions. Segregation and a narrowing of interest have resulted. Now, however, the movement is in the other direction: synthesis of the subject. This synthetic view recognizes not the rigidity of separate fields, but the cooperation of all fields. Botanists should see to it that their science is recognized as the greatest field for universal service; they should emphasize the connection between pure science and applied science; they must see to it that the spirit of competition between individuals, between research institutions, between investigators in other institutions and in the U. S. Department of Agriculture, is replaced by the spirit of cooperation.—*A. H. Chivers.*

1846. Fairbridge, Dorothea. **Food plants and those of economic value.** South African Gard. 9: 235–237. *2 fig.* 1919.

1847. Livingston, Burton E. **Some responsibilities of botanical science.** Science 49: 199–207. Feb., 1919.—This is vice presidential address given before Section G, American Association for the Advancement of Science, Baltimore, Dec., 1918. It emphasizes throughout the need for greater cooperation and *esprit du corps* among botanists. Two quite different aims are to be kept in mind by botanists: first, the preservation of botanical knowledge; second, addition to botanical knowledge. For the accomplishment of the first aim, a national or international institute for the furnishing of bibliographical information is needed. Such an institution, furnishing bibliographies on any topic, with or without abstracts, would conserve an enormous amount of time for scientific workers and research institutions. In discussing the second aim the author suggests that scientific research is unorganized and unrecognized as a reputable occupation and that this fact demands serious attention. The planning of research could be more effectively and consistently carried out if greater cooperation existed among competent thinkers; data could be more consistently procured, especially when practical difficulties arise, if the investigator would call upon competent colleagues for advice; the interpretation and presentation of results, too frequently poorly done, could be made easier if the possibilities of cooperation were employed. It seems highly desirable that several competent minds might be asked to make suggestions regarding any research, at several times, from its inception to the publication of the resulting contribution. Finally, attention is called to the fact that botanists, in working over the mass of botanical knowledge for the purpose of presenting it to others, and in selecting lines along which research is to be undertaken, will fail in discharging their responsibilities unless they give special attention to the scientific and philosophical aspects of the application of botanical science to all the various needs of man.—*A. H. Chivers.*

1848. Moore, George T. **Botanical participation in war work.** Science 49: 269–274. March, 1919.—The address (read at the symposium of Section G, American Association for the Advancement of Science, Baltimore, Dec., 1918) discusses some aspects of the way in which botany accomplished its full share in the war, and points out the importance of a recognition of the place which the subject should occupy in peace plans. The author calls attention to the services of specialists for their assistance; in suggesting botanical raw materials for the commercial man; in their work in connection with the Bureau of Air Craft Production and the Sanitary Corps; in the perfecting of gas masks; in connection with agriculture. Hundreds, perhaps thousands of determinations of plants have been made since the outbreak of the war for the purpose of giving the manufacturer definite knowledge of the source and value

of fibers, drugs, condiments, gums and other useful products. Some most fundamental and far-reaching results have thus been realized. However, the standing of the botanist as a benefactor of mankind has been little, if at all, changed. Those asking for information of the botanist often give little credit, and the credit due the science is soon forgotten. Some means of obtaining the recognition due botany should be devised. The author points out that it should not be the sole aim of botanical science to be of direct practical application; it would be a catastrophe to neglect pure botany or research. But research must be made worthy of the name.—*A. H. Chivers.*

1849. PARK, A. D. **Rural income tax: Specimen return for dairy farmers.** New Zealand Jour. Agric. **18**: 288–293. 1919.

1850. POTTS, GEORGE. **The pepper tree (Schinus Molle) in its relation to epidemic hay fever: Interim Report.** South African Jour. Sci. **15**: 525–530. 1919.

1851. RUTHVEN, ALEXANDER G. **The Edward K. Warren Foundation and two wild life reservations in Michigan.** Science **49**: 17–18. Jan., 1919.—An announcement of two wild life preserves, established by Mr. and Mrs. Edward K. Warren of Three Oaks, Michigan, and incorporated in the Edward K. Warren Foundation. The tracts (which are in Berien County) comprise 300 acres (150 or more original forest) near the town of Three Oaks, and over 250 acres in sand dune region on shore of Lake Michigan. Purposes of setting aside these reserves are: that future generations may have example of primitive floral and faunal conditions in southern Michigan; that nature-lovers may be able to find many animals and plants that are being exterminated elsewhere; that students may have available a place where they can study native plants and animals in natural habitats.—*A. H. Chivers.*

1852. WALLIS, T. E. **The use of amylic alcohol and sandarac in microscopy.** Jour. Quekett Microsc. Club **II, 14**: 13–18. 1919.—A mixture of amylic alcohol, sandarac and, castor oil was found to be very useful as a mounting medium, especially for mounts of insects mosses, etc. Directions for its use are given.—*Leva B. Walker.*

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BURTON E. LIVINGSTON, Editor-in-Chief
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AGRONOMY

C. V. PIPER, *Editor*

1853. ANONYMOUS. Seed mixtures for land affected by clover sickness. Jour. Bd. Agric. [London] 25: 1497–1499. 1919.

1854. BARBER, C. A. The growth of sugar cane. Internat. Sugar Jour. 21: 506–510. *1 pl., 12 fig.* 1919.—The first of a series of articles discussing certain points connected with the growth of sugar cane is presented for the agriculturalist. This article explains and illustrates very clearly the growth of a cane plant from both the cane seed and the cane set.—*E. Koch.*

1855. BARTHE, A. E. Organizacion moderna de los campos experimentales. IV. Auxilios matematicos en los ensayos culturales. [Mathematical aids in cultural experiments.] Revist. Agric. Com. y Trab. 2: 399–406. *Fig. 10–12.* 1919.—Bibliography appended.

1856. BIGGAR, H. HOWARD. The relation of certain ear characters to yield in corn. Jour. Amer. Soc. Agron. 11: 230–235. 1919.—The paper deals with the relation between certain ear characters and yield, in 5 varieties of maize grown at different points. The characters considered are; length of ear, weight of ear, number of rows of kernels and the shelling percentage. The results show that there seems to be no special relation between number of rows of kernels on the ears and yield, or between shelling percentage and yield. The characters of length and weight of ears show positive correlations with yield, but they are not consistently large. The character of length seems to be somewhat significant, at least for some of the varieties. The results suggest that there is no well-marked basis for using ear characters to indicate yield possibilities.—*F. M. Schertz.*

1857. BOAS. [Rev. of: Die Unkrautbekämpfung durch Kainit und Kalkstickstoff auf Ackerland. (Weed control through kainite and calcium cyanamide in arable land.) Deutsch. Landw. Presse 1916: 709–717. 1916.] Zeitschr. Pflanzenkrankh. 29: 57. 1919.—Wild radish, buttercup, lambs' quarters, and dock may be exterminated by application of either substance, with unusually good results. The cost is high. Thistles are resistant.—*H. T. Güssow.*

1858. BRACKEN, JOHN. Sunflower silage. Agric. Gaz. Canada 6: 542–543. June, 1919.—Sunflower silage fed to milking cows at the University of Saskatchewan produced slightly more milk, pound for pound, than did oat silage. Yields of sunflowers were twice as great when compared with corn. When the seed is in the milk stage the sunflower crop is considered in the best stage for silage.—*O. W. Dynes.*

1859. Brenchley, Winifred E. **Eradication of weeds by sprays and manures.** Jour. Bd. Agric. [London] 25: 1474–1482. 1919.

1860. Burgess, J. L., and C. H. Waldron. **Farm weeds of North Carolina and methods for their control.** Bull. North Carolina Dept. Agric. 40[3]: 3–53. *Illustrated.* 1919.—This paper is a descriptive account of 25 species of plants which are regarded as farm weeds. Each species is illustrated by line drawings of the plant organs and means of control are suggested.—*R. A. Jehle.*

1861. Butler, O. **Effect of wounds on loss of weight of potatoes.** Jour. Amer. Soc. Agron. 11: 304–306. 1919.—The loss in weight due to wounding was rapid during the first week of storage at 8–10°C. and decreased thereafter. The increased loss of weight due to wounding becomes extinct after 79 days when cut and uncut potatoes lose weight about equally. Slight wounding occasions a loss of more than 2 per cent by weight.—*F. M. Schertz.*

1862. Cook, O. F. **Experiments in spacing cotton.** Jour. Amer. Soc. Agron. 11: 299–303. 1919.—Experiments show that control of branching can be used to advantage. Because of the peculiar habits of the plant, spacing can best be determined by local control experiments for each variety of cotton.—*F. M. Schertz.*

1863. Doyle, H. W. **How they do it in Kaw Valley.** Potato Mag. 2[1]: 6–7, 24, 26. *3 fig.* 1919.—Describes potato culture in the Kansas River valley.—*Donald Folsom.*

1864. Ellis, J. H. **Silage crops other than corn.** Agric. Gaz. Canada 6: 540–541. June, 1919.—At the Manitoba Agricultural College each of 7 experimental silos was filled in the autumn of 1918 with the following crops: corn (maize), Sudan grass, millet, alfalfa, mixed cereals and peas in equal quantities, rape, buckwheat. Each crop was cut and ensiled when it was judged that the proper stage had been reached. The silos were opened on February 3, 1919, and samples analysed. Palatability tests were conducted with dairy cows. The silage in all 7 of the silos was in an excellent state of preservation. The cows showed a preference for Sudan grass silage with alfalfa ranking second. The others were eaten with equal relish, except that of buckwheat which was refused until all the others had been withheld. In general, oats and peas, or Sudan grass, is recommended as the best substitute for corn for silage where corn can not be grown successfully.—*O. W. Dynes.*

1865. Gaines, E. F. **Two important varieties of winter wheat.** Washington [State] Agric. Exp. Sta. Popular Bull. 116. *7 p., 2 fig.* 1919.—Red Russian and Hybrid 128, tested for yield from 1905 to 1918 inclusive showed 38.8 and 43.3 bushels respectively. The effect of time of seeding on yield and amount of smut (*Tilletia tritici*) is presented on the basis of a two-year average. Seeding on September 1 gave higher yield than earlier or later plantings. The per cent of smut was in agreement with that reported in other Washington Experiment Station bulletins (Bull. 125 and Popular Bull. 115).—*F. D. Heald.*

1866. Gessner, E. R. **Sugar cane culture.** Union of South Africa Dept. Agric. Bull. (Local Ser.) 84. *6 p.* 1919.

1867. Headden, Wm. P. **The vitality of alfalfa seed as affected by age.** Proc. Colorado Sci. Soc. 9: 239–249. 1919.—Tests show sound, clean alfalfa seed kept under "fair conditions" did not lose perceptibly in vitality in 23½ years; good commercial seed stored under "rather disadvantageous conditions" germinated 46 per cent after 27½ years; inferior seed under "rather indifferent conditions" had 16.5 per cent viable seeds when 2½ years old. Short bibliography.—*W. W. Robbins.*

1868. Hendry, G. W. **Climatic adaptations of the white Tepary beans.** Jour. Amer. Soc. Agron. 11: 247–252. 1919.—Tepary beans grown in the cool climates of the central and northern California coast districts develop abnormally. The white Tepary is more prolific than varieties of *Phaseolus vulgaris* in the semiarid interior districts of California. The white

Tepary is less prolific than varieties of *Phaseolus vulgaris* in the subhumid coast districts of central and northern California. The preblossoming period, the blossoming period and the life period are each functions of the climate. They are longer in cool climates than in warm climates and they are either increased or diminished as the planting date causes them to occur during cool or warm weather.—*F. M. Schertz.*

1869. Johnson, T. C. **Potato growing in Eastern Virginia.** Potato Mag. 2^2: 8–9, 24–25. *2 fig.* 1919.

1870. Karraker, P. E. **What is the value of the usual laboratory work given in general soil courses?** Jour. Amer. Soc. Agron. **11**: 253, 256. 1919.

1871. Keeler, M. D. **Profits of commercial potato storage.** Potato Mag. 2^2: 10–13, 30. *5 fig.* 1919.—Also describes methods and plans for use on farms.—*Donald Folsom.*

1872. Kiesselbach, T. A. **Experimental error in field trials.** Jour. Amer. Soc. Agron. **11**: 235–241. 1919.—See Bot. Absts. 4, Entry 378.

1873. Kincer, Joseph B. **Temperature influence on planting and harvest dates.** Monthly Weather Rev. **47**: 312–323. *20 fig.* 1919.

1874. Krishnamurti, Row K. **The effect of salinity on the growth and composition of sugar cane varieties.** Agric. Jour. India **14**: 476–493. *11 pl., 5 charts.* 1919.—See Bot. Abst. 3, Entry 2928.

1875. MacMillan, H. G. **The vitality of alfalfa roots.** Proc. Colorado Sci. Soc. **9**: 251–252. 1919.—Cites unusual vitality of alfalfa roots, and the ability of an alfalfa root shattered and decayed at both ends, without a crown, and with no opportunity for growth in a cultivated field for 1 year, to send out from an adventitious bud 3 shoots, 1 of which bore leaves and rootlets.—*W. W. Robbins.*

1876. Mainwaring, C. **Linseed.** Rhodesia Agric. Jour. **16**: 326–327. *1 pl.* 1919.

1877. Mainwaring, C. **Weeds.** Rhodesia Agric. Jour. **16**: 313–315. *1 pl.* 1919.

1878. Mathews, J. W. **Economic plants at the National Botanic Gardens, Kirstenbosch, and the aim of their cultivation.** South African Jour. Indust. **2**: 749–758. 1919.

1879. Moreno, Eduardo. **La combustibilidad del tabaco. Contribucion al estudio agro-quemico de la hoja. [Combustibility of tobacco.]** Revist. Agric. Com. y Trab. **2**: 377–379. 1919.—In a series of tests on the effect of different fertilizing materials on the burning quality of tobacco it was found that a mixture of the double phosphate of lime, ammonium sulphate and sulphate of potash increased the combustibiltiy; cyanamide may be applied in only very small quantities due to danger of toxic effects, and potash should be applied in the form of sulphate.—*F. M. Blodgett.*

1880. Preston, C. F. **Comparison of varieties in Pennsylvania.** Potato Mag. 2^3: 14–15. *1 fig.* 1919.

1881. Robson, R. **Control of the weeds Whitlow pepperwort and black mustard.** Jour. Bd. Agric. [London] **26**: 56–63. *4 fig.* 1919.—Whitlow pepperwort (*Lepidium draba*), a weed said to be above ground as bad as charlock and below ground as bad as bindweed, can be satisfactorily controlled by spraying with copper sulphate alone at the rate of 80 gallons of a 4 per cent solution per acre, or with copper sulphate in combination with either ammonium sulphate or sodium nitrate.—Black mustard (*Sinapis nigra*) was also controlled by similar means.—*M. B. McKay.*

1882. Severance, George. Twenty-eighth annual report for the year ending June 30, 1918. Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—Contains brief summary reports of experimental work, including the following of interest to botanists: Botany (weeds), chemistry (some phases of soil science), farm crops, horticulture, plant pathology and soils. The pathologist's report contains the first published record of the aecial stage of *Puccinia graminis* on barberry for the Pacific coast, though specimens had been collected as early as 1896.—*F. D. Heald.*

1883. Sewell, M. C. Tillage; a review of the literature. Jour. Amer. Soc. Agron. 11: 269–290. 1919—The review includes the early history and philosophy of tillage; preparation of seedbeds; cultivation of crops as related to soil moisture, nitrification and yield; soil aeration and nitrification. The review leads to the following conclusions: Plowing deeper than 7 inches has not generally resulted in increased crop yields; the best depth of plowing, less than 7 inches, has not been determined; the question of frequency of plowing has not been answered; cultivation may be necessary only to kill weeds and keep the soil in a receptive state to absorb rainfall.—*F. M. Schertz.*

1884. Sievers, F. J., and E. G. Schafer. Sugar beets under irrigation in Washington. Washington [State] Agric. Exp. Sta. Bull. 154. *41 p., 11 fig.* 1919.—A popular account without experimental data.—*F. D. Heald.*

1885. Skvortzow, B. W. Notes on the agriculture, botany and zoology of China. Jour. North China Branch Roy. Asiatic Soc. 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 2462.

1886. Smith, J. W. The effect of weather upon the yield of potatoes. Potato Mag. 1^{10}: 11–14, 32; 1^{11}: 15–17; 1^{12}: 7, 16–17, 27; 2^{1}: 16–17, 33–34. *Fig. 1–23.* 1919.—Summarizes data regarding relationship of mean temperature to regions of origin, to growth and to time of planting and harvesting; frost dates; water requirements; thermal constants; temperature and rainfall by 10- to 50-day periods; importation of seed potatoes; optimum conditions for various diseases.—*Donald Folsom.*

1887. Stapledon, R. G., and Hilda Loveday. "Shelled" grain in oats. Jour. Bd. Agric. [London] 26: 489–496. 1919.—A certain amount of shelled grain, usually not exceeding 3 to 5 per cent by weight, is of common occurrence in oat samples received at the seed testing laboratory. On the average, the shelled grain germinates about 24 per cent below the normal unshelled grain. This relatively poor germination is not due to the influence of drying on the unprotected grain, but would seem to be due to the mechanical injury received during the thrashing operations.—*M. B. McKay.*

1888. Stapledon, R. G. The temporary ley. Jour. Bd. Agric. [London[25: 1280–1311. 1919.—Experimental evidence is presented to show the most desirable seed mixtures to be used in the temporary ley in Wales. For the 3- to 4-years ley the following species may be used with confidence at the indicated rate in pounds per acre: perennial rye-grass 7–14, cocksfoot 6–12, timothy 3–5, rough-stalked meadow-grass $1\frac{1}{2}$–2, crested dog's tail $1\frac{1}{2}$–2, late flowering red clover 3–4, Alsike clover 1, wild white clover $\frac{1}{2}$–1; total minimum to acre 28 to 30 pounds, maximum 35 pounds. For a two-years ley slight modification of the mixture is necessary: rough-stalked meadow-grass and crested dog's tail should be omitted; English white clover could often replace wild white clover or a mixture of the two may be used, a mixture of broad red clover and late flowering red clover should always be used; the rye-grass should consist in part of Italian rye-grass; cocksfoot and timothy ought to be retained in most mixtures; on very dry soils the inclusion of tall oat grass is often an advantage.—*M. B. McKay.*

1889. Stapledon, R. G., and Margaret Adams. The effect of drying on the germination of cereals. Jour. Bd. Agric. [London] 26: 364–381. 1919.—Many samples of cereal seed received during two seasons at the seed testing station gave poor germination when first

received. As a rule, the germination of such seed was much higher when retested after either kiln-drying for 3 days at 40°C. or air-drying for three weeks at laboratory temperatures. Wheat, barley, and rye responded better to kiln-drying than to air-drying. Oats, on the other hand, responded better to air-drying. The apparent condition of a sample frequently afforded little or no index to its germination. Samples of seed which give a low germination in the "as received" test should be retested after conditioning. In such cases the retest gives, as a rule, a better index of the commerical value of the sample for seed purposes.—*M. B. McKay.*

1890. Stead, Arthur. **The sulphur requirements of crops.** Agric. Jour. South Africa **10**: 13–21. 1919.

1891. Talmage, R. H. **Intensive potato growing on Long Island.** Potato Mag. 2^1: 9, 29. *3 fig.* 1919.

1892. Taylor, E. P. **Uniformity of rules and regulations of potato seed certification.** Potato Mag. 2^2: 7, 21–23. *1 fig.* 1919.

1893. Taylor, H. W. **Tobacco seed beds.** Rhodesia Agric. Jour. **16**: 306–312. 1919.

1894. Todd, P. H. **The cultivation of aromatic plants in the United States.** Amer. Jour. Pharm. **91**: 437–441. 1919.—The author reviews the volatile oil industry, placing emphasis on the development of this industry in the United States. A number of volatile oils are discussed as to the present sources, necessary climatic conditions, etc. During the past few years the production of aromatic oils has increased to a very great extent in the United States. The production of some of the principal volatile oils, as peppermint, spearmint, pennyroyal, wintergreen and sweet birch, is not only sufficient for American needs but permits a large exportation to foreign countries. It is intresting to note that in the case of peppermint, about nine-tenths of the total world's supply is produced in a few counties of southern Michigan and northern Indiana. In summarizing the prospects for home production the author states that it would seem that in our vast country, with its variety of climates—hot, cool, dry and humid—and its endless varieties of soils and geological formations, a suitable combination of soil and climate can be found for every perfume bearing plant of present importance to the trade. The one single determining factor that will make successful culture of these plants possible or impossible seems to be the element of labor.—*Anton Hogstad, Jr.*

1895. Trueman, J. M. **Silage crops other than corn.** Agric. Gaz. Canada **6**: 538–539. June, 1919.—Results of experiments carried on at the Nova Scotia Agricultural College for the past 5 years indicate that a mixture of oats, peas, and vetches will produce a higher yield than Indian corn. The average analysis of this mixture compared with immature corn shows 6.78 per cent more in dry matter and 58 per cent more protein. A satisfactory silage is made of a mixture of these three crops.—*O. W. Dynes.*

1896. Wale, Bernard N. **The removal of hedgerows.** Jour. Bd. Agric. [London] **25**: 1408–1424. 1919.—See Bot. Absts. 3, Entry 2068.

1897. Waterbury, H. E. **Colorado stores her own potatoes.** Potato Mag. 2^3: 6–7, 29–30. *6 fig.* 1919.—Construction of houses is described.—*Donald Folsom.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

1898. A. B. R. [Rev. of: Van Tieghem, P. **Elements de botanique.** [Elements of botany.] 5-éd. 8vo. Tome I, Botanique générale, revue et corrigée par J. Costantin; *xv + 619 p., 260 fig.* Tome II, Botanique speciale, remaniée et augmentée par L. Costantin; *xx + 743 p., 326 fig.* Masson: Paris, 1918.] Jour. Botany **57**: 197–198. 1919.

1899. Anonymous. **Agricultural schools and experiment farms.** Official Year Book Union South Africa 2: 448–450. 1919.—There are five agricultural schools and experiment farms in the Union; particulars are given concerning the regular courses, extension work, experimental and research work undertaken at these establishments.—*E. M. Doidge.*

1900. Anonymous [Rev. of: Cook, M. T. **Applied economic botany.** J. B. Lippincott Co.: Philadelphia, 1919. (See Bot. Absts. 3, Entry 491.)] Amer. Bot. 25: 116–117. Aug., 1919.—"One of the first books to indicate an approaching change in the subject matter of plant studies."—*Reviewer.*

1901. Anonymous. **Botanic gardens.** Amer. Bot. 25: 101, 105. 1919.—Credited to "News, Imperial Department Agriculture, B. W. I. [British West Indies]."

1902. Anonymous. [Rev. of: Gruenberg, B. C. **Elementary biology.** *x + 528 p., 261 fig.* Ginn and Co.: Boston, 1919.] Amer. Bot. 25: 115–116. Aug., 1919.—The reviewer is convinced "that a combination of the showy parts of botany and zoology will never be successfully substituted for courses in the sciences named."—*Reviewer.*

1903. Barthe, A. E. **Campitos escolares. [School gardens.]** Revist. Agric. Com. y Trab. 2: 443–453. *6 fig.* 1919.

1904. [Bruckman, Louisa, and C. Stuart Gager.] **Educational conference on biology in New York City high schools.** Brooklyn Bot. Gard. Rec. 8: 95–121. July, 1919.—Report of conference held under auspices of Brooklyn Botanic Garden at the laboratory building, April 4, 1919. Includes remarks by various speakers, principals of New York High Schools, university professors, and others on educational value of botany and general biology in high schools. The associate superintendent of New York City schools was reported to have said that general biology, as a high school subject, did not "function." Majority of speakers contended that biology has demonstrated beyond question that it has value equivalent to any other subject of the high school course from the standpoint of both content and discipline. The occasion of the conference was the movement to introduce into New York City High Schools courses in general science and community civics. This would result in eliminating general biology, at least as a required subject in the first year of the high school.—*C. S. Gager.*

1905. Caldwell, Otis W. **The Gary Public Schools: science teaching.** *viii + 125 p.* The General Education Board: New York, 1919.—One of a series of eight reports, embodying the results of a survey of the Gary (Indiana, U. S. A.) public schools, made by the General Education Board, on invitation of the Board of Education and the Superintendent of Schools of Gary. Gives a detailed account of the theory, equipment, actual practice, and results of the so-called "duplicate" system (Gary system) so far as concerns nature study, school gardens, zoology, and botany. The botany work largely centers around applied topics or "projects," in horticulture and agriculture, with special attention to the botany of cultivated plants. Gives list of "projects," and detailed outline of course in "botany" for seventh and eighth grades. Treats in similar manner of Zoology, Physics, and Chemistry. In the *Conclusion* author states that the pupils were interested, "but they were more than interested—they were being trained to think and act effectively. The teaching of botany and gardening at the Froebel school . . . . kept in close contact with the facts and needs of life. Elsewhere, however, the instruction was too frequently formless and aimless." Author notes a "lack of continuity and of organizing purpose. . . . . Gary's science supervision is nominal and its staff conferences far too rare to answer their purpose." Gary has "shown courage and resourcefulness in trying to free science teaching from its remote and abstract character, in trying to bring it into touch with the pupil's experience and to relate it to his other school work;" but "beyond a general and sound predilection for the concrete is embodied in the environment and experience of the pupil, it is impossible to discern at Gary satisfactory principles of organization or progression in science teaching. Unquestionably, the children are interested in their science work and derive pleasure from it, and to this end the work is of

value. But science fulfills its educational mission, not simply by arousing interest in a disconnected series of phenomena . . . . but by cultivating capacity to deal intelligently and vigorously with significant problems. . . . . Unless so presented, science is likely to be a transient diversion rather than a profoundly formative and truly disciplinary influence in the pupil's development.—*C. S. Gager.*

1906. Chapman, H. H. **Forestry as a vocation.** Amer. Forestry 25: 1075–1077. 1919.

1907. Claasen, P. W. **The tale of the cat-tail.** Nat. Study Rev. 15: 244–246. *2 fig.* Sept., 1919.—Cat-tail fruits furnish home for larvae of moth *Lymnaecia phragmitella.*—*A. Gundersen.*

1908. Cockayne, L. **Presidential address, New Zealand Institute Science Congress, Christchurch, 1919.** New Zealand Jour. Sci. Technol. 2: 241–251. July, 1919.

1909. Conard, Henry S. **Old and new classification.** School. Sci. Math. 19: 592–593. Oct., 1919.—No one would cling to an outworn system merely on grounds of convenience. Urges abandonment of Thallophyta, Bryophyta, Pteridophyta and Spermatophyta classification in favor of a dichotomous one Thallophyta, Embyrophyta, the latter divided into Atracheata and Tracheata, and the last again into Lycopsida and Pteropsida. More fully in March (1919) *Plant World.*—*A. Gundersen.*

1910. Davis, Bradley M. **Introductory courses in botany.** School Sci. Math. 19: 629–632. Oct., 1919.—Replies to requests from the Division of Biology, National Research Council, giving three outlines of introductory courses in botany.—*A. Gundersen.*

1911. [Gager, C. Stuart.] **Statements of high school principals as to the value of general biology in the high schools of greater New York.** Brooklyn Bot. Gard. Rec. 8: 121–126. July, 1919.—Replies to a letter of inquiry sent by author to all New York City high school principals not present at the conference on similar topic held at Brooklyn Botanic Garden, Apr. 4, 1919. Almost unanimous testimony to the superior value of general biology as a subject for high school study.—*C. S. Gager.*

1912. Grier, N. M. **Teaching a "Reading" textbook of botany.** School Sci. Math. 19: 723–726. Nov., 1919.—Our science courses must be largely informational for a time. A great deal of microscopical work is far from beneficial. Botany should be the outlet for every other talent of the pupil which can be made to bring to bear on it. The great groups of plants and their subdivisions should not be forgotten. Definite mental pictures must be formed as to what are the algae, fungi, lichens, mosses, ferns, conifers and palms.—*A. Gundersen.*

1913. Gruenberg, Benjamin C. **Elementary biology.** *x + 528 p. Fig. 261.* Ginn & Co.: Boston, 1919. [See Bot. Absts. 3, Entry 1902.]

1914. Hausman, E. H. **The common milkweed.** Nat. Study Rev. 15: 238–241. *2 fig.* Sept., 1919.—Study of flower and fruit.—*A. Gundersen.*

1915. Hogstad, Anton, Jr. **The medicinal plant garden and the pharmacist.** Northwestern Druggist 27: 389–391. 1919.—The author discusses the development of the medicinal plant garden for commercial purposes by many manufacturing pharmacists and lists 22 schools and colleges that have medicinal plant gardens. He shows that these gardens are a means of very readily acquainting the student of pharmacy with the nature and characteristics of the many drug plants and helps him to retain this knowledge and that they are of inestimable value for purposes of research.—*Oliver Atkins Farwell.*

1916. Karraker, P. E. **What is the value of the usual laboratory work given in general soil courses?** Jour. Amer. Soc. Agron. 2: 253–256. 1919.

1917. Kmjerskog-Agersborg, H. P. **The teaching of natural science in the primary and secondary schools of Norway.** School. and Soc. 9: 673–678. 1919. Abstr. in Brooklyn Bot. Gard. Rec. 8: 147–148. Oct., 1919.—Nature study includes botany, zoology, human physiology and hygiene, geography, physics and chemistry. It is taught through each year of the primary school, middle school, and gymnasium and is studied by all pupils. The place, time, and point of view for each of these sciences is given, together with a tabular presentation of the science curricula of the primary and middle schools.—Botany is introduced in the fifth year of the primary school and continues two years. The point of view is generally economic and physiological. In the middle school emphasis is placed upon the classification and life histories of seed plants. Not until the student has reached the gymnasium is biology presented from an evolutionary point of view. Both botany and zoology are presented as laboratory and lecture courses. All students in the gymnasium get some biology, but students in science courses get about twice as much as others.—This training results in the production of a common body of scientific knowledge in the community, and in a high degree of appreciation for natural science.—*W. L. Eikenberry.*

1918. Lange, D. **Mysteries and revelations of the plant world.** Amer. Forestry 25: 1273–1280. *14 fig.* 1919.—Popular.—*Chas. H. Otis.*

1919. Lantes, Adelaide. **Como se prepara un herbario. [Preparing an herbarium.]** Revist. Agric. Com. y Trab. 2: 454. *1 fig.* 1919.

1920. Martin, John N. **Botany for agricultural students.** *16 × 24 cm., x + 585 p., 488 fig.* John Wiley & Sons, Inc.: New York, 1919.—See Bot. Absts. 3, Entry 2165.

1921. McWilliams, C. K. **The agricultural short course in the high school.** School Sci. Math. 19: 614–618. 1919.—In 1860 one-sixth of United States population resided in towns, in 1910 45 per cent lived in cities. As rural population decreases, more machinery is necessary to perform farming operations, demanding more training. Three million farm laborers with an additional million just starting life on farms should be reached through winter short courses. Course in Geneseo Township High School includes soils and crops, horticulture, general science, English; farm mechanics, farm carpentry, general science, English; animal husbandry, farm arithmetic, community civics, English; farm management, business methods, farm accounting, English. Books dealing with specific subjects are preferable to texts on general agriculture.—*A. Gundersen.*

1922. Meyer, Frank B. **The appeal that trees make as memorials.** Gard. Chron. Amer. 23: 166–167. *2 fig.* 1919.

1923. Munz, P. A. **The acacia.** Nat. Study Rev. 15: 233–237. *3 fig.* Sept., 1919.—Species grown in California.—*A. Gundersen.*

1924. Rusby, H. H. **The New York Botanical Garden.** Pharm. Era 52: 197–200. *5 fig.* 1919.—The garden contains nearly 400 acres at the upper end of Bronx Park. The physical features of the Garden are described in general terms but the principal theme of this paper is the Economic Garden and the Economic Museum. Typical representatives of the various classes are grown in the garden. The economic specimens occupy the entire ground floor of the Museum; here are kept the drug specimens. Whenever possible these have been properly authenticated by competent botanists, collectors and herbarium specimens from the plant yielding the product. The figures illustrate a view of the Garden, a plan of the Economic Museum, the cases, and the style of label used. The western half of the upper floor contains the experimental and research laboratories, the eastern half the Garden herbarium and that of Columbia University, which together number more than a million and a half specimens. The building also houses a library of over 29,000 bound volumes and all current botanical periodicals. Thousands upon thousands of city children make their first acquaintance with cultivated crops at the New York Botanical Garden.—*O. A. Farwell.*

1925. Sampson, Arthur W. **Suggestions for instruction in range management.** Jour. Forestry 17: 523–515. 1919.—See Bot. Absts. 3, Entry 2052.

1926. Shinn, Harold B. [Rev. of: Hodge, C. F., and Jean Dawson. **Civic biology** *381 p. 166 fig.* Ginn & Co.: Boston, 1918.] Plant World 21: 261–262. Oct., 1918.

1927. Traver, Jay. **How mother nature sows her seeds.** Nat. Study Rev. 15: 247–259. *9 fig.* Sept., 1919.—Autumn is the time to study seed dispersion, which occurs: (1) by elastic tissues (cranesbill, jewel-weed, violet, wisteria, witch-hazel, squirting cucumber, salvia); (2) by water (water lily, cocoanut palm, dock, arrowhead, bladdernut, lyme grass); (3) by wind (ash, elm, maple, linden, pine, milkweed, poplar, dandelion, smoke tree, clematis, button wood, tumble weeds, small seeded fruits); (4) by animals (beggar's ticks, tick trefoil, cocklebur, burdock, avens, nuts, berries, etc., seeds carried by ants, by water birds, and man).—*A. Gundersen.*

1928. Vinal, W. G. **Mainly the pedagogy of seeds with some seeds of pedagogy.** Nat. Study Rev. 15: 213–232 *2 pl.* 1919.—Describes suggestive exercise with drawing of bur-marigold seeds. Adaptations of dandelion. In study of seeds, seed coat, seed scar, seed leaf, seed stem, seed bud and doorway (for micropyle) are suggested as simple names. Seedlings should be grown. Study of seed dispersal by wind, animals, mechanical contrivances and water.—*A. Gundersen.*

1929. Wells, B. W. **Botany laboratory guide for elementary and general botany courses.** *23 × 16 cm. 40 p.* Published by the author: Fayetteville, Arkansas, 1918.

CYTOLOGY

Gilbert M. Smith, *Editor*

1930. Alvarado, Salustio. **Sobre el verdadero significado del "sistema de fibrillas conductor de las excitaciones en las plantas" de Nemec. (Un dato para la historia del condrioma vegetal.) [True significance of Nemec's system of filaments for conducting stimuli in plants.]** Bol. R. Soc. Española Hist. Nat. 19: 147–152. *2 fig.* 1919.—The author reviews Nemec's article (Die Reizleitung und die reizleitenden Strukturen bei den Pflanzen, 1901) and points out that the structures described and figured by Nemec are manifestly similar to the mitochondrial apparatus of vegetable cells discovered in *Nymphaea alba* by Meves three years later. Nemec was able to obtain coloration of the filaments in his preparations of various roots only for a very brief period immediately before death of the tissue and, according to Guilliermond, this is true of the mitochondrial filaments also. The best observations of the filaments were made from material fixed and stained almost exactly the same as the material with which Meves later worked. Nemec observed the filaments particularly in the periblem, and to some extent in plerome of rootlets of various plants, but almost never in the exterior part of the periblem, the hypodermis, or the dermatogen. The filaments most clearly appeared in those meristematic cells which are not dividing but are energetically enlarging and have large vacuoles, the filaments there running in the longitudinal protoplasmatic trabeculae and describing curves and loops and often closely approaching the nucleus. Alvarado points out that this corresponds closely with the evolution of chondriomes in the root tips of beans or chick-peas proximal to the growing point; first granules or short rods, then in young cells of the pleroma transforming into chondriomes each time larger, until at the stage when Nemec observed his filaments, the mitochondrial filaments are to be found following the trabeculae, curving or looping, and some of them passing near the nucleus. The sheath of Nemec's filaments is no doubt the tonoplast which is to be seen at times either near the mitochondria, the plastids, or the starch grains. Nemec subjected plants studied to diverse agents in order to observe action of external conditions on the fibers, and the results are similar to those obtained by authors who, like Guilliermond, have experimented on the chondriosomes: in plasmolysis the filaments break up and finally disappear. The author believes that he has demonstrated Nemec's filaments to be chondriosomes and that the claim that they are conductive filaments is thus invalidated.—*O. E. Jennings.*

1931. Alvarado, Salustio. **La fina estructura de los vasos leñosos (Nota previo). [Minute structure of wood vessels.]** Bol. R. Soc. Española Hist. Nat. 19: 66–75. *7 fig.* 1919.—See Bot. Absts. 3, Entry 1567.

1932. Bailey, Irving W. **Phenomena of cell division in the cambium or arborescent gymnosperms and their cytological significance.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 283–285. July, 1919.—Growth and cell division in the cambium of woody plants seem to have been little studied by other workers, probably because of the difficulty of sectioning. This paper reports cytological phenomena observed in *Pinus Strobus*, the species with which the writer's methods were perfected. The very long and slender cambium cells are uninucleate. In "normal longitudinal divisions" the spindle is placed diagonally in the cell, and the mitotic figure is asymmetrical. After nuclear division the spindle is extended lengthwise of the cell by the addition of peripheral fibers, while the central fibers disappear and are replaced by the cell plate. Thus two separate masses of fibers are formed, designated *kinoplasmasomes*. These kinoplasmasomes gradually recede to the ends of the mother cell, which is then longitudinally bisected by the cell plate. During the formation of the cell plate the daughter nuclei remain near the center of the mother cell.—*H. B. Frost.*

1933. Digby, L. **On the archesporial and meiotic mitoses of Osmunda.** Ann. Botany 33: 135–172. *Pl. 8–12.* 1919.—Several species, but principally *Osmunda palustris*, were used for this work. Fixing was done on warm days, about noon, and the material was plunged into 30 per cent alcohol at 30°C. for a few seconds before placing it in the fixing fluid. Most of the illustrations are from material fixed in strong Flemming solution.—Considerable attention is given to the archesporial mitoses, especially the last sporogenous mitosis, immediately preceding the reduction divisions, and all these mitoses were found to have the general character of vegetative divisions. A diagrammatic scheme, in color, makes it easy to understand Miss Digby's interpretation. Each univalent chromosome has a dual nature which persists throughout chromosome dissolution and reconstruction. Longitudinal fission occurs in late anaphase. The parallel threads, seen in telophase of the last sporogenous mitosis, are identical with the parallel threads seen in prophase of the heterotypic mitosis. During synapsis these parallel threads become closely associated and emerge from synapsis as a univalent filament, but there may be a space in its substance, marking the line along which fission will occur as the chromosomes separate during the homotypic mitosis. Segments of the univalent filament become associated in pairs, and the two members of each pair are separated in the heterotypic mitosis. The homotypic mitosis simply separates the two longitudinally associated parts of each member of the pair, the splitting or fission of the chromosomes being merely the reappearance of the fission which was seen in the daughter chromosomes of the heterotypic telophase.—*Charles J. Chamberlain.*

1934. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. 6: 273–300. 1919.—Author brings together, from cytology, colloid chemistry and genetics, data which bear on the problem of the chemical and physical characteristics of protoplasm. Emphasizes importance of the cell theory.—Modern cytology recognizes the existence of localized spatially differentiated regions of the cell body (such as plastids) in which physiological processes take place. It has given up the old "corpuscular" theories of the structure of protoplasm, though these are still suggested by the modern discussions of chondriosomes and mitochondria. Chromosomes have received intensive study and their importance in heredity has been established, although we still know little about their structure or the means whereby they control the process of development.—Following a recognition and study of the colloidal state of matter, the earlier and cruder theories of the chemistry of protoplasm have been superseded by the conception of the cell as a polyphase colloidal system, a conception which is in harmony with many of the observed facts of cytology. It fails, however, to explain polarity, a conspicuous characteristic of the living cell.—Evidence from genetics, and particularly from the Mendelian hypothesis of unit factors, and the conception of the chromosomes as "so many chains of factorial beads," tends to suggest the old and now refuted idea of spatial configuration in

the germ plasm. Author believes that "the structure of protoplasm is the structure of the cell as an organized system and itself the unit in all the complex interactions by which the egg develops into the specialized and differentiated many-celled organism." [See Bot. Absts. 3, Entry 2133.]—*E. W. Sinnott.*

1935. Hibino, S. [Rev. of: Heusser, K. Neue vergleichende Permeabilitätsmessungen zur Kenntnisse der osmotischen Verhältnisse der Pflanzenzelle in kranken Zustande. (New comparative measurements of permeability to ascertain the osmotic relations of diseased plant cells.) Vierteljahrsschr. Naturforsch. Ges. Zürich 62: 565–589. 1917.] Bot. Mag. Tôkyô 33: 135–138. 1919.

1936. Hibino, S. [Rev. of: Trondle, A. Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten. (The influence of light on the permeability of the plasma-membrane, and the method of permeability coefficients.) Vierteljahrsschr. Naturforsch. Ges. Zürich 63: 187–213. 1918.] Bot. Mag. Tôkyô 33: 138–140. 1919.

1937. Hurd, Annie May. Some orienting effects of lights of equal intensities on Fucus spores and rhizoids. Proc. Nation. Acad. Sci. [U. S. A.] 5: 201–206. *1 table.* June, 1919.—See Bot. Absts. 3, Entry 2909.

1938. Kihara, Hitoshi. Über cytologische Studien bei einigen Getreidearten. [Cytological studies of some cereal crosses.] Bot. Mag. Tôkyô 33: 21–38. *21 fig.* 1919.—See Bot. Absts. 2, Entry 946; 4, Entry 627.

1939. Kihara, Hitoshi. Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftverhältnisse unter Avena-arten. [Cytological Studies in the Cereals. II. Chomosome counts in reference to the relationship of oat species.] Bot. Mag. Tôkyô 33: 94–97. *2 fig.* 1919.—The following counts were obtained from root tips and pollen mother-cells: (1) 7–14 chromosome form, *Avena strigosa;* (2) 14–28 chromosome form, *A. barbata;* (3) 21–42 chromosome forms, *A. fatua, A. sativa, A. sterilis, A. byzantina,* and *A. algeriensis.* He holds that these results are not inconsistent with the classification proposed in 1914 by Zade based on the results of serum experimentation.—*Leonas L. Burlingame.*

1940. Lynch, Vernon. The function of the nucleus of the living cell. Amer. Jour. Physiol. 48: 258–283. 1919.

1941. Moreau, Fernand. Une anomalie dans l'histoire nucléaire des spores de l'Endophyllum Sempervivi Lév. [An anomaly in the nuclear division of spores of Endophyllum Sempervivi.] Bull. Trimest. Soc. Mycolog. France 35: 98–101. *1 fig.* 1919.—The author states that the origin of binucleated spores among the Uredinales is generally attributed to the fusion of uninucleated cells just below the aecium. Quite different however is the origin of four-nucleate spores, which the author observed in *Endophyllum Sempervivi.* In *Endophyllum* it is not the cellular fusion which brings about four-nucleate cells, for the spores containing four nuclei are not seen at the base. The young spores contain only two nuclei. The nuclear division takes place within the older spores, forming spores with four nuclei. Two of the four nuclei degenerate immediately, leaving two large nuclei which fuse within the older spores. Occasionally the author observed some terminal spores containing six nuclei, attributed to the division of two nuclei of a primitive four-nucleate spore. The nuclear divisions have the characteristics of the karyokinetic division of the Uredinales.—*Fred C. Werkenthin.*

1942. Twiss, W. C. A study of plastids and mitochondria in Preissia and corn. Amer. Jour. Bot. 6: 217–234. *Pl. 33–34.* 1919.—A review of the more important literature on mitochondria and their relation to plastids is presented, together with observations on these structures in *Zea Mays* and *Preissia commutata.* The author obtained best results with Benda's method for fixing and staining, which is outlined in detail. In the root tips of corn,

undoubted mitochondria are abundant in the embryonic region, plastids are abundant farther back, and between the two are bodies apparently intermediate in character. Evidence is presented that at least some of the "oil bodies" or "elaioplasts" of Preissia are true plastids. Mitochondria are also present in this genus in the growing region of the disc, and are apparently related to certain of the oil bodies in the mature cells. The author believes that mitochondria exist and are normal constituents of the cytoplasm, but regards evidence as to their division and their function in heredity as inadequate. The mitochondrial origin of chloroplasts is discussed, but author takes no definite position thereon.—*E. W. Sinnott.*

1943. Yamaha. [Rev. of: Weatherwax, P. **Gametogenesis and fecundation in Zea mays as the basis of Xenia and heredity in the endosperm.** Bull. Torrey Bot. Club. 46: 73–90. 1919. See Bot. Absts. 2, Entry 717.] Bot. Mag. Tôkyô 33: 165–166. 1919.

ECOLOGY

H. C. Cowles, *Editor*

1944. Andrews, E. F. **The Japanese honeysuckle in the United States.** Torreya 19: 37–43. *2 fig.* 1919.—*Lonicera japonica* Thunb., until recently known in this country only as a cultivated plant, has escaped widely in the eastern United States, especially in the South, its range extending from Texas to Massachusetts. It spreads very rapidly by runners, and smothers out other vegetation. Under these conditions it rarely flowers, but propagates chiefly by vegetative means.—*J. C. Nelson.*

1945. Arber, Agnes. **Aquatic angiosperms: The significance of their systematic distribution.** Jour. Bot. 57: 83–86. Apr., 1919.—See Bot. Absts. 3, Entry 733.

1946. Bär, Joh. **Die Vegetation des Val Onsernone (Kanton Tessin). [The vegetation of the Val Onsernone (Canton Tessin).]** Ber. Schweiz. Bot. Ges. No. 26. *80 p. 1 map.* June, 1918.—A detailed account of the distribution of vegetation in the drainage basin of the Isorno, Kanton Tessin, Switzerland. The area approximates 113 square kilometers and is characterized by very rugged relief, being surrounded by mountain chains ranging above 2000 meters. Throughout the region ravines are so numerous as to leave very few flat areas of any considerable size. Precipitation is high, averaging about 80 inches and the greatest rainfall occurs during the season of vegetative activity. The climate in general is decidedly "Insubrian." The altitudinal distribution on northern slopes shows the following zonation: chestnut 250–900 meters; beech 900–1100 meters; silver fir 1100–1600 meters; spruce 1600–1700 meters; larch 1700–2000 meters. On southern slopes the zonation shows an upward advance: chestnut 250–1050 meters; beech 1050–1750 meters; larch 1750–2100 meters. Certain species of oak, linden, birch and alder form distinct stands depending mainly on local climatic and edaphic factors. Aside from the forest types the author describes the distribution and composition of the deciduous and coniferous scrub types; the meadow and heath types; the swamp, moor and freshwater types; and the ruderal vegetation which is well developed in spite of the barriers that tend to exclude it. [Unsigned full rev. in Jour. Ecol. 6: 235–239. 1918; unsigned rev. in Nature 102: 243. 1918; rev. by Tubeuf in Nat. Zeit. Forst. Landw. 16: 358–359. 1918.]—*P. D. Strausbaugh.*

1947. Bennett, Arthur. **Potamogeton acutifolius Link.** Jour. Botany 57: 101. 1919. On p. 17 of the same volume of this journal lat. 60° 12′ n. was given as the northern limit of this species. A specimen is now reported from lat. 62° 30′ n. in Finland.—*K. M. Wiegand.*

1948. Bowman, H. H. M. **Botanical ecology of the Dry Tortugas.** Carnegie Inst. Wash. Publ. 252: 109–138. *6 pl., 7 fig.* 1918.—The flora of these eight small coral islands is essentially a strand flora determined by the uniformly xerophytic conditions which prevail. In this flora four fairly distinct associations are recognized: (1) the Uniola community; (2) the Suriana community; (3) the Opuntia community; and (4) the Chamaesyce community.

The content and distribution of these four associations are discussed, each island being considered separately. Constant reference is made to the notes of Lansing's survey made in 1904 with a view to pointing out changes in the general flora of the region which have occurred in the twelve intervening years, and possible reasons for such changes are suggested.—*P. D. Strausbaugh.*

1949. BRAUN-BLANQUET, JOSIAS. **Eine pflanzengeographische Excursion durchs Unterengadin und in dem schweizerischen National park. [A phytogeographic excursion through the Lower Engadine and in the Swiss National Park.]** Ber. Schweiz. Bot. Ges. 26. *79 p., 1 map.* March, 1918.—An account of a series of ecological excursions conducted under the auspices of the Schweizerischen Naturforschenden Gesellschaft through portions of eastern Switzerland in early August, 1916. The vegetation encountered is described in detail from the standpoint of climatic, physiographic and edaphic relations. An ecological classification, and complete list of the plants are given for each separate region in which studies were made. —*P. D. Strausbaugh.*

1950. BROCKMANN-JEROSCH, H. **Das Lauben und sein Einfluss auf die Vegetation der Schweiz. [Leaf-stripping and its influence on the vegetation of Switzerland.]** Jahresber. Geogr. Ethnogr. Ges. Zürich. *20 p., 4 fig.* May, 1918.—In central Europe there are many districts such as the Val Onsernone in which the leaves and twigs of trees are used to provide food for the cattle, sheep, goats and even hogs during the winter season. The foliage and young twigs are cut, dried and stored during the summer, and also the fallen leaves may be gathered. Elm, ash, oak, linden and white fir furnish the greater part of this sort of "fodder," although juniper needles and the leaves of fruit trees are also used. This practice is a relict of a much more widely spread custom that prevailed in earlier times. It has left its impress upon the character of the vegetation in the peculiar forms of the trees as a result of the periodical removal of the younger parts, and also in the distribution of the trees as largely determined by man's protection, selection and planting. In places the practice has been almost completely abandoned and hay has been substituted for tree foliage as food. This change has led to the building up of rich meadows through the application of artificial fertilizers, and accounts for the origin and existence of such meadows in central Europe. Naturally, such grassland areas would pass directly into forest formation but owing to the dense stand of the grasses and the annual cutting with scythes, the invading tree species are entirely suppressed.—*P. D. Strausbaug.*

1951. CHURCH, A. H. **Weighing moorings.** Jour. Botany 57: 35–37. 1919.—The insecurity of sand, gravel and rock fragments as an anchorage for maritime algae is pointed out, as influenced by the lifting force of the specific gravity of the water especially under wave action, and also by the lifting force of the bladder-bearing seaweeds. When insecure, the moorings may be weighed, and the whole drift out to sea, or in shore. Germinating zoospores of *Enteromorpha*, each attached to a particle of sand, may be floated off by the incoming tide, each supported by its bubble of oxygen. *Calpomenia sinuosa*, a Mediterranean Phaeosporean, appeared in the Gulf of Morbihan in 1906, attached to oysters. The thallus, filled with photosynthetic gas bubbles, acted as a float, floating the oysters out to sea; and was thus a menace to the oyster industry. The amount of sea weed thrown on the shore is probably only a small part of that floated out to sea and lost. Experiments by MR. SPENCE on the lifting of stones by Laminarias are outlined, and the results stated; also the lifting power of a giant *Macrocystis* is speculated upon.—*K. M. Wiegand.*

1952. COWLES, HENRY C. **Starved Rock State Park and its environs. Part III. Botany.** Bull. Geog. Soc. Chicago 6: 129–148. *3 fig.* 1918.—The flora of the State Park is discussed under four separate heads: (1) the oak forest uplands; (2) the canyons; (3) the river bluffs; and (4) the bottom lands. The oak forest is confined to the upland margins and consists principally of *Quercus alba* and *Q. rubra*. *Q. macrocarpa* is the dominant oak of the margin next to the prairie, and *Q. velutina* occupies the drier places. Owing to excessive pasturing,

the natural undergrowth has been practically destroyed.—The canyons are the centers of scenic interest; they are characterized by great diversity of plant life and the presence of many rare species. A half dozen liverworts and twice as many species of ferns make up a very interesting portion of the plant population.—The river bluffs present the opposite of living conditions noted in the canyons. In the latter shade and moisture are prevalent while in the former full exposure to sun and wind results in a habitat suited only to such plants as are found in dry areas. However, certain plants found commonly in bogs and swamps are present here, owing to the fact that absorption of water in these exposed situations is no more difficult than it is under bog conditions.—The fertility of the bottom lands has made them very desirable for agricultural purposes so that in large part the natural vegetation has disappeared. Only on flood plain margins and on the river islands can an idea of the richness of this natural vegetation be obtained.—The author concludes with a brief account of the history of the flora, and an analysis of the changes that are in progress at the present time.—*P. D. Strausbaugh.*

1953. De Vries, Hugo. **The relative age of endemic species.** Science 47: 629–630. June, 1918.—De Vries reasserts his belief in the validity of the age-and-area hypothesis of Willis, concluding that "in every systematic group of plants the rule prevails that the most widespread species are the oldest, whereas the others are younger, the smaller their area is."—*P. D. Strausbaugh.*

1954. Dorsey, M. J. **Adaptation in relation to hardiness.** Minn. Hortic. 46: 465–469. *1 fig.* 1918.—Certain data bearing on the relation of the maturation period to hardiness are presented. There is an essential difference between a variety and a species in respect to growth response as a result of adaptation to environment. The author says, "it would be expected, however, that the same forces operating to produce differences in a species would do the same in time with variations arising within a variety."—*P. D. Strausbaugh.*

1955. Du Rietz, G. E. Th. C. E. Fries, and T. A. Tengwall. **Vorschlag zur Nomenklatur der soziologischen Pflanzengeographie. [Nomenclature in sociological plant geography.]** Svensk. Bot. Tidskr. 12: 145–170. 1918.—A discussion of phytogeographical classification including descriptions, examples and definitions of the terms used, such as formation, association, facies, aspect, etc. Emphasis is placed upon the need for a clearer and more unified nomenclature in the literature dealing with phytogeographical classification.—*P. D. Strausbaugh.*

1956. Emig, W. H. **The travertine deposits of the Arbuckle Mountains, Oklahoma, with reference to the plant agencies concerned in their formation.** Oklahoma Geol. Surv. Bull. 29. *76 p. 22 fig. 2 pl., 2 maps, 1 table.* 1918.—The travertine forms several waterfalls in creeks in the Arbuckle Mountains, in the semi-arid southwestern part of the state, and algae and mosses have played an important part in its deposition. [See also Bot. Absts. 2, Entry 222.] —*Roland M. Harper.*

1957. Ferguson, William C. **Plants in flower in the autumn of 1918 on Long Island, N. Y.** Torreya 19: 12–13. 1919.—The autumn of 1918 was warmer than any previously observed in this vicinity. A list is given of 16 species in fresh bloom at Garden City, L. I., on Oct. 28–30, 1918, and a second list of 50 species collected between Pine Lawn and Lake Ronkonkoma on Nov. 1–2.—*J. C. Nelson.*

1958. Gleason, Henry A. **On the development of two plant associations of northern Michigan.** Plant World 21: 151–158. June, 1918.—Describes successional stages in the cleared maple-beech forests and in abandoned fields in same region. Tables show frequency indices of all plants in quadrats studied at two and three year intervals. The principal species in clearings are *Acer pennsylvanicum*, *Sambucus racemosa* and *Rubus idaeus*. The maples require five years to reëstablish their dominance. The dominant plant in abandoned fields is *Poa pratensis.*—*Forrest Shreve.*

1959. Gray, John, and George J. Peirce. **The influence of light upon the action of stomata and its relation to the transpiration of certain grains.** Amer. Jour. Bot. 6: 131–155. *18 fig.* 1919.—See Bot. Absts. 3, Entry 436.

1960. Griggs, Robert F. **Asclepiadora viridis in Ohio.** Ohio. Jour. Sci. 19: 299. 1919. —The occurrence of *Asclepiadora viridis* in the Sugar Grove area is a notable extension of the range of this southern plant.—*H. D. Hooker, Jr.*

1961. Griggs, R. F. **Scientific results of the Katmai expeditions of the National Geographic Society. IV. The character of the eruption as indicated by its effects on nearby vegetation.** Ohio Jour. Sci. 19: 173–209. 1919. The eruption of Katmai in 1912 destroyed the surrounding vegetation by acid rains, ashfall, hot blasts, mud flows and fires. All life was annihilated over an area of 140 square miles. The condition and reactions are described and illustrated by photographs. Plants that lay buried for 3 years came up from the old roots in 1915, when the ash was removed by a flood. The cause of dormancy is discussed. [See also next following Entry, 1962.]—*Henry D. Hooker, Jr.*

1962. Griggs, Robert F. **Scientific results of the Katmai expeditions of the National Geographic Society. IX. The beginnings of revegetation in Katmai Valley.** Ohio Jour. Sci. 19: 318–342. 1919.—The first stages of revegetation in the valley of Katmai River are described. The agents of revegetation are: (a) surviving woody plants, chiefly the larger willows, that protrude through the ash; (b) herbage in places cleared of ash, consisting of *Elymus arenarius* and *Equisetum arvense;* and (c) seedlings of lupines, willows and the grasses, *Deschampsia caespitosa* and *Calamagrostis langsdorfii*. The more important factors determining distribution seem to be the concentration of requisite salts, high wind velocity and shifting streams. The essential problem of revegetation is the nitrogen supply. [See also next preceding Entry, 1961.]—*H. D. Hooker, Jr.*

1963. Gruber, C. L. **Fragrant wildflowers.** Amer. Bot. 25: 8–13. 1919.—A list of 125 fragrant species from Pennsylvania is given and an attempt is made to indicate the amount of fragrance of each.—*W. N. Clute.*

1964. Harshberger, J. W. **Alpine fell-fields of eastern North America.** Geog. Rev. 7: 233–255. *12 fig.* Apr., 1919.—The fell-fields (a European term for rocky areas with sparse vegetation in cold climates) described and illustrated are on the higher mountains of New England and New York. Comparisons are made with similar areas in other parts of the world. The author believes it is important to correlate in similar fashion the related plant formations of different regions.—*Roland M. Harper.*

1965. Hitchcock, A. S. **A botanical trip to Mexico.** Sci. Monthly 8: 129–145, 216–238. *34 fig., 5 maps.* 1919.—The article is illustrated with views of Mexican scenery, life and plants. It is a brief summary of observations made in connection with a trip in the summer of 1910. The technical report upon the grasses is published as Contr. U. S. Nat. Herb. 17: 181–189. 1913. A small map with 500-meter contour interval indicates the greater topographic features, a plateau 3000–8000 feet in altitude with a strip of lowland along each coast. Other maps give the annual and monthly rainfall.—Northern Mexico is arid, the rainfall being less than 10 inches (25 mm.). The precipitation increases towards the south. The maximum, 114 inches (2867 mm.), is at Córdoba.—A map giving the location of the 37 collections, shows them to be widely distributed, with the larger number of places in the region from Córdoba to Mexico City. A few places are south of this area and many are north, extending almost as far as El Paso, Texas. A table is given listing the collections by locality, state, altitude, date, and field numbers of the specimens.—The second part of the paper discusses the common wild grasses of Mexico. It is suggested that the ecologist will readily coordinate the flora upon the basis of the grasses. Thirteen species are listed for the eastern coastal plain and six for the western. These coastal plains grasses are of no particular agricultural importance, except those on the sandy flats around Vera Cruz. The plateau furnished a much larger

number of species, only the more conspicuous sorts being mentioned, some 20 species in all. Habitat and plant are listed with a brief descriptive phrase. It is noted that specimens collected at Manzanillo in the same habitat as those collected by Humboldt and Bonpland at Acapulco a short distance to the south, correspond perfectly to the original description and plate. Guadalajara is another locality furnishing type specimens of these early travelers. Other collectors and collections are mentioned. One new genus and 22 new species are reported from this trip.—*Lula Pace.*

1966. Jennings, O. E. **Potamogeton Vaseyi in northeastern Ohio.** Ohio Jour. Sci. **19**: 343. 1919.—*Potamogeton Vaseyi* has been collected at Brady's Lake, Portage Co., and at Cowles Creek, near Geneva-on-the-Lake, Ashtabula Co.—*H. D. Hooker, Jr.*

1967. Killip, Ellsworth P. **Fern hunting in Panama.** Amer. Fern Jour. **9**: 5–17. 1919. —The article is a general description of the fern flora of the Isthmus of Panama. In addition to the three or four hundred different species of ferns, a number of which are new, the author collected grasses and flowering plants.—*F. C. Anderson.*

1968. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. **11**: 143–162. *2 fig.* 1919.—From the results of these studies it is seen that wheat flowers do not universally bloom early in the morning. Experiments were conducted at the Minnesota Agric. Exp. Sta. and at Arlington, Va. The time of blooming of 2977 wheat flowers in 69 heads were recorded. Of these 1492 bloomed at night, and 1485 during the day. Of those blooming during the day 764 bloomed before noon and 721 in the afternoon. Two daily periods of extensive blooming were determined, one from 7 to 9 in the morning and the other about the middle of the afternoon. It was found necessary to protect emasculated flowers in order to prevent undesired pollination. [See Bot. Absts. 3, Entry 2161.]—*J. J. Skinner.*

1969. Lewis, I. F. **The vegetation of Shackleford Bank [Carteret Co., North Carolina].** North Carolina Geol. Surv., Econ. Paper 46. *32 p. 11 pl.* 1918.—Shackleford Bank is a barrier beach similar in general features to many others along the coast of the southeastern United States. The soils and climate are briefly discussed, and the vegetation is divided into several formations and associations. There is a brief description of Bogue Bank (the next beach on the west), a few pages of suggestions for checking the drifting of the sand, and a discussion of the geographical affinities of the flora. Over 200 species are listed, and their habitats indicated by symbols.—*Roland M. Harper.*

1970. Markle, M. S. **A comparison of the plant succession on Hudson River limestone with that on Niagara limestone near Richmond, Indiana.** Proc. Ind. Acad. Sci. **1917**: 109–113. 1918.—The Hudson River limestone is softer than the Niagara limestone and contains varying amounts of shale. Owing to this difference in physical character, the plant succession on these two kinds of rocks is strikingly different. On the Hudson River limestone the succession is much more rapid and lichens are not found in the pioneer association.—*P. D. Strausbaugh.*

1971. Nichols, G. E. **Raised bogs in eastern Maine.** Geog. Rev. 7: 159–167. *2 fig.* Mar., 1919.—Bogs of this type are in the United States chiefly confined to southeastern Maine, and they occur also in New Brunswick and Cape Breton. They are in a region of boreal coniferous forests, and they are by no means universal even in the regions of their greatest abundance, many flat bogs also occurring near by. They are distinguished by their convex surface, the centers being sometimes 10 feet higher than the edges. *Sphagnum papillosum* is a characteristic plant.—*Roland M. Harper.*

1972. Oliver, F. W., in Carey, Alfred E., and F. W. Oliver. **Tidal lands: a study of shore problems.** *277 p. 29 pl., 54 fig.* Blackie & Son Limited: London, 1918.—A presentation of certain problems which concern the maritime engineer, including extensive studies

of the coastal vegetation and its relation to shore phenomena in general. The United Kingdom's coast foreshore at high-water line is approximately 8000 miles long and the river frontage extends for nearly 12,000 miles. These figures indicate something of the importance of the reclamation problem where the total acreage between high- and low-water mark approaches 800,000 acres. Plants are dealt with principally as important factors from an engineering point of view, their mechanical value depending upon their capacity for reducing the mobility of the sub-stratum together with their tendency to enhance accretion. "It is the power which plants have of organizing and retaining ground which gives them value in this connection, and makes it desirable to ascertain in detail the part which each species of plant plays in its own particular zone. For, armed with this knowledge, it becomes possible by artificially introducing a given species at the appropriate moment to hasten the passage of one phase into the next, and thus promote accretion without pauses or delays. Should this practice be adopted we should look forward to a time when, by vegetation methods, combined with temporary engineering constructions for protection from scour and the control of currents, tidal lands would mature for final reclamation not only more rapidly than is at present the case, but also in topographical distribution conveniently for the purpose." The rôle of plants in stabilizing dunes and shingle beaches, and in the reclamation of salt marshes is discussed in detail. The most efficient plants are listed and the features which enable them to establish and maintain successful growth in their respective habitats are pointed out and carefully described. The book includes one of the best discussions of the salt marsh that can be found anywhere in the English language.—*P. D. Strausbaugh.*

1973. Ramaley, Francis. **Notes on dune vegetation at San Francisco, California.** Plant World 21: 191–201. *4 fig.* Aug., 1918.—Describes dunes along the coast of the Pacific immediately south of the Golden Gate. Large areas are without plants. The leading pioneers are *Franseria chamissonis* and *Abronia latifolia.* Low shrubby plants predominate and annuals and introduced plants are few. The associations of low, of exposed, and of sheltered situations are described. A list is given of 48 species found on the dunes.—*Forrest Shreve.*

1974. Ramaley, Francis. **The rôle of sedges in some Colorado plant communities.** Amer. Jour. Bot. 6: 120–130. *2 fig.* 1919.—A study of the part played by sedges in the plant communities of northern Colorado. 8 genera of the Cyperaceae are considered, but the bulk of the paper is devoted to *Carex*, 44 species being listed and classified ecologically. The plant associations in which the genus is important are discussed. Most sedges are either aquatic or marsh plants, or are xerophytes; and usually belong to earlier stages of succession. As mesophytism is approached from either direction, sedges tend to be displaced by grasses and dicotyledons.—*E. W. Sinnott.*

1975. Ramaley, Francis. **Xerophytic grasslands at different altitudes in Colorado.** Bull. Torrey Bot. Club 46: 37–52. *2 fig.* 1919.—The aim of the writer is to report the ecological and floristic differences existing between the xerophytic grasslands at different altitudes in Colorado. A synopsis is made of the associations, environmental influences are recorded, a systematic list of species is given, and the floristic differences at different altitudes are discussed.—*P. A. Munz.*

1976. Rigg, George B. **Early stages in bog succession.** Publ. Puget Sound Biol. Sta. 2: 195–210. *Pl. 2.* March, 1919.—*Sphagnum* grows on drained as well as undrained areas. It forms no peat on well drained soil, but in moderately drained situations it forms peat slowly. It may form a peat bog by beginning as hummocks on poorly drained prairie; by advancing upon ordinary swamps among or upon sedges and rushes; or by filling lakes from the margin. In encroaching upon shallow water it may advance alone; on deep water it may advance over woody bog plants.—*T. C. Frye.*

1977. Salisbury, E. J. **The ecology of scrub in Hertfordshire: a study in colonization.** Trans. Herts. Nat. Hist. Soc. 17: 53–64. 1918.—Two types, woodland-scrub and thicket-scrub, are distinguished, the former being comparatively open and embracing many species

of woody plants including seedling trees, the latter being a closed association with few species and almost no trees. Characteristic shrubs of the thicket type are Ulex, *Prunus spinosa* and Crataegus. The herbaceous flora of the woodland-scrub is abundant but that of the thicket scanty and confined to the margin. Lists of species from different stages of transitions from scrub to forest are given and the relations of the associations to natural woodland pointed out. (Abstract in Jour. Ecol. 6: 234. 1918.)—*Geo. D. Fuller.*

1978. Schröter, C. **Über die flora des Nationalparkgebietes im Unterengadin. [On the flora of the National Park district in the Lower Engadine.]** Jahrb. Schweiz. Alpenclub. 52: 170–211. *29 fig. 5 pl.* 1918.—A brief discussion of the establishment, extent and purpose of the Swiss National Park is followed by a general survey of its ecological features and a description of the dominant plant associations of the region. The author emphasizes the possible use of the preserve as a laboratory in which numerous, significant ecological experiments can be conducted since the range of conditions represented is so varied and extensive. —*P. D. Strausbaugh.*

1979. Small, James. **The origin and development of the Compositae. Chapter 10. Geographical distribution.** New Phytol. 18: 1–35. *Pl. 1–6.* 1919.—A historical summary of the geographical distribution of Angiosperms is followed by a discussion of *Senecio*. This is considered to have arisen in the Bolivian region of South America, and to have migrated, mostly along mountain ranges, to North America, thence by Behring Strait to Asia and Europe, and thence to Africa. Two pages are here devoted to the ecology of the genus.—Then follows a discussion of the distribution (6 p.) and ecology (2 p.) of the tribes of the Compositae. The author supports Willis' Age and Area hypothesis from the facts of the distribution of the various tribes.—The bibliography includes 135 titles. The plates consist of graphic maps illustrating the genera and tribes.—*I. F. Lewis.*

1980. Soper, E. K., H. F. Bergman, and others. **The peat deposits of Minnesota.** Minnesota Geol. Surv. Bull. 16. *261 p. 17 pl., 10 fig. 4 maps.* May, 1919.—Peat is abundant in the northeastern half of Minnesota, as in many other glaciated regions with coniferous forests. About one-fifth of the area of the state was originally swamp, and about half of this, or 5,217,000 acres has at least 5 feet of peat. The total quantity of workable peat is estimated at nearly 7,000,000,000 tons. Several counties on the southwestern or prairie portion of the state are reported to have no peat at all.—The ecological feature of Minnesota peat bogs are very similar to those described by other writers in the same state and farther east in the same latitude. A special chapter on the vegetation of Minnesota swamps is contributed by H. F. Bergman. The remainder of the bulletin is mainly economic.—*Roland M. Harper.*

1981. Stevens, G. W., and C. W. Shannon. **Plant life in Oklahoma.** Oklahoma Geol. Surv. Bull. 27: 215–246 1918—Includes a sketch of the plant geography of the state, and an annotated list of trees and shrubs, the latter taken with some modifications from Circular 4 of the Survey, by C. W. Shannon (1913)—*Roland M. Harper.*

1982. Visher, S. S. **The geography of South Dakota. A detailed discussion of the surface, resources, climate, plants, animals, and human geography, including the history of the area.** South Dakota Geol. Nat. Hist. Surv. Bull. 8. *177 p. 52 fig.* 1919.—In Chapter 6 (p. 68–108), entitled "The bio-geography," plants and animals are discussed together and classified by regions and habitats. A few illustrations of vegetation are included.—*Roland M. Harper.*

1983. Watson, W. **Plants in flower at the end of December, 1918.** Jour. Botany 57: 100–101. Apr., 1919.

1984. Willis, John C. **The age and area hypothesis.** Science 47: 626–628. June, 1918. —In replying to criticisms of Sinnott and Berry, the author points out that, since the hypothesis can be used successfully as a basis for predictions concerning the distribution and composition of a given flora, "it deserves at least a very careful investigation before being rejected." —*P. D. Strausbaugh.*

1985. Willis, J. C. **The sources and distribution of the New Zealand flora, with a reply to criticism.** Ann. Botany 32: 339–367. *7 fig. 1 map.* July, 1918.—In this article the author employs facts concerning the flora of New Zealand and adjacent islands in defense of his age and area hypothesis. It is emphasized that the hypothesis is meant to apply only in cases of about twenty allied species and not in individual cases. The age and area explanation of species distribution is to be regarded as a general law whose action may be more or less obscured by the presence of active factors other than age. Twenty-eight questions are proposed which must be answered satisfactorily by the supporters of the dying-out hypothesis in order to fully substantiate their claims. The age and area hypothesis accounts for the presence and distribution of endemics more convincingly than the assumption that they are representatives of a relict flora. In its present stage of development the theory is entirely incapable of accounting for the relative age of herbs, shrubs and trees.—*P. D. Strausbaugh.*

1986. Willis, J. C. **The flora of Stewart Island (New Zealand): a study in taxonomic distribution.** Ann. Botany 33: 23–46. *2 fig.* 1919.—The author tests his well-known age-and-area hypothesis in a study of the flora of Stewart Island, south of the South Island of New Zealand. Knowing the flora of New Zealand and of three sets of widely separated outlying islands, and assuming in accordance with the conclusion reached in a previous article that New Zealand has been populated by two great invasions, one northern and one southern, the author predicts what the flora of Stewart Island should be if the age-and-area hypothesis is correct. He also makes many predictions of details in connection with the proportionate representation of groups of various ranks, affinities of endemics, width of distribution etc. All his predictions proving correct with a wide margin, the author maintains that the age-and-area law on which they were based is by far the principal factor in determining geograph ical distribution.—*W. P. Thompson.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

1987. Afzal, Muhammed, and others. **Progress report of forest administration in Baluchistan for 1917–18.** *20 p.* Calcutta, 1919.—A routine report on forest operations in the province.—*E. R. Hodson.*

1988. Amilon, J. A. **Höjdtillväxtens förlopp hos träd med olika ljusbehov. [The march of height growth in trees of different light requirements.]** Skogsvårdsfören. Tidskr. 17: 95–108. 1919.—Statistics in regard to relative light requirements and rate of height growth for different tree species in Sweden show that the culmination of height growth occurs earlier in the "light-demanding" than in the "shade-enduring" species. The most "light-demanding" species such as larch, birch and pine, attain their maximum rate of height growth at 10–15 years, while in the most "shade-enduring" species, such as spruce and beech, the maximum is reached at 30–40 years. This relation does not always hold in comparing trees growing on different sites and under different climatic conditions. Such discrepancies, however, are apparent rather than real, due to the fact that under favorable growing conditions the age of a tree as expressed in calendar years is not a true index of its progress in the life cycle of the species. Height growth culminates later, as measured in years, in a tree growing under unfavorable conditions than in a tree of the same species growing under favorable conditions. It is also commonly accepted that trees growing under unfavorable conditions have higher light requirements than trees of the same species growing under favorable conditions of soil and climate. The author concludes that if proper standards of comparison are utilized the relative light requirements and the culmination of height growth remain the same for a given species under varying conditions of site and climate.—*G. A. Pearson.*

1989. Anonymous. **American substitutes for boxwood.** Sci. Amer. 120: 223, 236. *3 fig.* 1919.—Florida boxwood and wahoo are the only native woods having properties approaching boxwood (Turkish, Persian, Corsican or English). Witch hazel, great rhododendron, moun-

tain laurel, thornapple, orangewood, torchwood, mastic and yellow buckeye have some of the characteristics of boxwood and might be used for less exacting purposes.—*Chas. H. Otis.*

1990. Anonymous. **Brimstone tree of Sierra Leone.** Kew Bull. Misc. Inf. [London] 1919: 103–104. 1919.—This is a further account of the brimstone tree, a name applied to species of *Morinda*, family Rubiaceae and to *Mitragyne stipulosa* Kuntze [*Mitragyne macrophylla* Hiern.]—*E. M. Wilcox.*

1991. Anonymous. **Le service forestièr de l'Armée d'Orient. [The forest service of the Army of the Orient.]** Rev. Eaux et Forêts 57: 196–199. 1919.—In January, 1918, a forest service was formally established in the French Army of the Orient. This service was charged with the duty both of supplying the French army with wood and of apportioning the forests and wooded regions in the zone of the rear among the various allied armies. In spite of the many difficulties encountered, it succeeded in meeting all of the needs of the army for wood, saved tonnage, stabilized prices, and preserved many forests from destruction.—*S. T. Dana.*

1992. Anonymous. **Tabanuco gum or Porto Rican elemi.** Sci. Amer. Suppl. 87: 201. 1919.—The plant yielding the Porto Rican elemi is known botanically as *Dacryodes hexandra.* The tree is abundant on the island of Porto Rico and attains large size. The bark contains great quantities of gum, locally known as tabanuco. It is used for incense and in torch making. It is thought that a good use can be made of it in the manufacture of varnishes, soaps, felting and printers' ink.—*Chas. H. Otis.*

1993. Anonymous. **The grass tree resins of Australia.** Sci. Amer. Suppl. 87: 137. 1919. —Fourteen species of *Xanthorrhoea* or "grass tree" occur in Australia. The resins collected from these trees may be made to yield picric acid, in amounts varying from 50 per cent in the case of *X. hastilis* to 5 per cent in resin from *X. arborea.* The resins are used in the preparation of spirit lacquers, varnishes, sealing wax, and for similar purposes.—*Chas. H. Otis.*

1994. Anonymous. **Textile fibers in Germany.** Sci. Amer. Suppl. 87: 217. 1919.

1995. Anonymous. **The tonka beans of commerce.** Sci. Amer. Suppl. 87: 78. 1919.— See Bot. Absts. 3, Entry 2801.

1996. Aubert, L.-G. **L'oïdium et les chênes de l'Ouest de la France. [Oïdium and the oaks of western France.]** Rev. Eaux et Forêts 57: 189–195. 1919.—The fears which were expressed by M. Doé in Rev. Eaux et Forêts, March, 1919, as a result of his experiences in Champagne, that the oïdium disease may prove fatal to the oak in France, are not substantiated by the history of the fungus in the western part of the country. Here, in spite of the fact that the disease has been present and at times virulent since 1907, no serious damage has been done and no particular difficulty has been experienced in converting coppice stands into high forest. The explanation of the markedly different reaction of the oak to the fungus in the two regions appears to be that in Normandy and Brittany the oak is in the zone of optimum growth, while in the more continental climate of Champagne its physiological resistance is less. Even in western France, however, individual trees suffer seriously from the disease when their vitality has been weakened by frequent pollarding or other mistreatment.—*S. T. Dana.*

1997. Bates, C. G. **A new evaporimeter for use in forest studies.** Monthly Weather Rev. 47: 283–294. *6 fig.* 1919.

1998. Bell, T. R. D., and others. **Administration report of the forest circles in the Bombay Presidency (including Sind), 1917–18.** *178 p.* Bombay, 1919.—At the close of the year the area of reserved forests was 13,942 square miles, and 7728 square miles were under approved working plans. Tarwad (*Cassia auriculata*) was, under pressure to develop tanning materials for leather required for war purposes, taken up for its bark and efforts make to increase its natural supply. Many tons of seed were collected in the Northern Circle and sown, and

excellent growth resulted in the Presidency where the young plants came up like grass; but unfortunately the ensuing season was extremely unfavorable for want of rain and most of them perished. Thousands of acres were sown by plowing furrows and dibbling and it is more than probable that with a good year, it will be possible to extend the range of the species. In the Central and Southern Circles, divi-divi (*Acacia concinna*) was also planted for tanning, but it is a tree and will take at least 15 to 20 years to produce fruit, which is the utilizable portion. This tree thrives best away from the sea coast at an elevation of 2000 feet, as for example, in Dharwar and Belgaum; doubtless also in Poona and Nasik where the rainfall is over 25 inches. Experiments in introducing various species of Eucalyptus, Grevillea and Casuarina, at Toranmal, were continued and all are promising well. If a Eucalyptus could be found which would be successful on the Mahableshwar and Panchgani plateaus it would help to solve the very difficult question of the fuel supply at those places. Specimens of *Anogeissus latifolia* and *Terminalia arjuna*, held locally at North Khandesh to be quite distinct from the ordinary varieties, were sent to the Forest Botanist for investigation. *Terminalia tomentosa* railroad ties supplied from Kanara W. D. to the N. W. railway in 1911 were reported on favorably again.—*E. R. Hodson.*

1999. Berry, J. B. **Measuring woodland products.** Georgia State Coll. Agric. Bull. 142. *16 p., 7 fig.* 1918.—A discussion of the board foot unit as applied to the sawn product, round logs and standing trees. A simple method of estimating woodland timber is described. —*James B. Berry.*

2000. Blunt, A. W., and others. **Progress report of forest administration in the province of Assam for the year 1917–1918.** *29, 49 p., 1 map.* Shillong, India, 1918.—A routine annual report for the province. The area of reserved forests in Assam was increased by 470 square miles during the year and an additional area of 329 square miles was in process of reservation at the close of the year. A new departure was a beginning in the formation of village forests, under the management of local committees for the supply of fuel and other petty forest produce to the villagers. Six forest villages were established in the Western Circle, the villagers giving free labor for the usual number of days, and no trouble was experienced in handling them. During the year the gross revenue increased, due to larger returns from grazing and to the demand for railway sleepers and tea-box timber. Experiments were continued in burning the undergrowth in sal (*Shorea robusta*) forests to favor regeneration and were successful, to a certain degree, in the higher and drier localities where the undergrowth burned freely.—*E. R. Hodson.*

2001. Boulger, G. S. [Rev. of: Stebbing, E. P. **Commercial forestry in Britain, its decline and revival.** *186 p.* John Murray: London, 1919.] Jour. Botany 57: 260–262. 1919.

2002. Campbell, R. H. **Report of the Director of Forestry for the year 1918. (Pt. 3, Ann. Rept. Canadian Dept. Int., 1918.)** *70 p., 13 fig.* Ottawa, 1919.—Progress is indicated in the extension of fire laws in the prairie provinces, the establishment of a forest experiment station at Petawawa, Ontario, the collection of Pacific Coast tree seeds for tree planting in the British Isles, and the testing at the request of the New South Wales government of Australian woods believed to be valuable for pulping. At the Dominion Forest Products Laboratory in Montreal the project of compiling all the literature from all languages on waste sulphite liquors has been completed, and in other projects such as the resolution of alcohol from pulp waste liquors, the investigation of the chemistry of pulpwoods, and tie impregnation experiments on jack pine and hemlock a considerable degree of success has been attained.—*H. C. Belyea.*

2003. Cavendish, F. H. **Report on forest administration in the Andamans for the year 1917–18.** *39 p.* Calcutta, 1919.—A routine report covering forest operations in the Andaman Islands.—*E. R. Hodson.*

2004. Chevalier, A. **Premier inventaire des bois et autres produits forestièrs du Tonkin. [First inventory of the timbers and other forest products of Tonkin.]** Bull. Econ. Indochine 22: 495–540. 1919.

2005. Clutterbuck, P. H. **Annual progress report of forest administration in the United Provinces, 1917–18.** *60 p.* Allahabad, India, 1918.—The routine annual report with statements in tabular form appended. The area of reserved forests increased from 5582 square miles to 5957 square miles during the year, while the entire area now under control is 7495 square miles. Exclusive of leased forests the area of the forests under the control of the Forest Department is 6.7 per cent of the total area of the provinces. At the close of the year 4038 square miles were under approved working plans. Some form of regulated felling is practised on 66 per cent of the area under working plans. The chir (*Pinus longifolia*) tar work has passed the experimental stage and the product may be placed with the resin industry as an established minor forest product. A separate report has been published on the resin industry for the financial year which presents a very detailed description of the present position of the industry in Kumaun and brings the history of the progress made in recent years up to date. Experimental plots are maintained in West and East Almora to ascertain the effects of grazing and burning on chir seedlings, as well as the influence of heredity and environment, in causing twisted fiber (spiral grain). Results are not yet shown, as sufficient time has not elapsed. 28,280 maunds (maund = 80 pounds) of various tan stuffs were collected and sent to the government tannery at Allahabad.—*E. R. Hodson.*

2006. Compton, W. **Forest economics: some thoughts on an old subject.** Amer. Forestry 25: 1337–1339. 1919.—A contribution to the general topic "A national forest policy." The future permanent supply of standing timber as a raw material for industry is a problem of economics. How much timber, what kinds of timber, where it should be located, what lands should be timbered and how the timber should be used can not be determined by applying principles of forestry. When the nation's timber needs have been determined—then the principles of forestry correctly applied may show how these needs can best be met. Fourteen points to be considered in connection with a national plan for efficient forest utilization and adequate replacement of timber are discussed in some detail.—*Chas. H. Otis.*

2007. Cornthwaite, H. G. **Panama rainfall.** Monthly Weather Rev. 47: 298–302. *4 fig.* 1919.

2008. Crevost, C., and C. Lemarié. **Plantes et produits filamenteux et textiles de l'Indochine. [Fiber and textile producing plants of Indo China.]** Bull. Econ. Indochine 22: 365–401. *3 pl., 1 fig.* 553–591. *2 pl., 9 fig.* 1919.—See Bot. Absts. 4, Entry 53.

2009. Dana, Samuel T. **Public control of private forests in Norway.** Jour. Forestry 17: 497–502. 1919.—The laws under which Norway handles its private forests, which constitute 75 per cent of the forest area, are summarized. Local communities can adopt regulations for handling protection forests, the boundaries being fixed by a state forester and private owners. Regulations handling protection forests are provided for by the council and must have the approval of the national forest service. Burning is prohibited, all dry, dead material must be removed before any green tree is cut, and community councils establish other rules. Forests not coming under the control of the community are managed by the government and cutting under 20 cm. is forbidden in coniferous forests.—*E. N. Munns.*

2010. Danielson, Uno. **De Öländska skogsmarkernas produktionsförmåga. [Productive capacity of the forest lands of Öland.]** Skogsvårds Fören. Tidskr. [Stockholm] 17: 12–18. *5 fig.* 1919.

2011. De Brun, H. **Les taillis du midi et la guerre. [Coppice in southern France and the war.]** Rev. Eaux et Forêts 57: 147–150. 1919.—The lack of labor and means of transportation resulting from the war have delayed the regular cuttings in the evergreen oak cop-

pice stands of southern France by 2, 3, and even 4 years. This delay may be a blessing in disguise since it affords an opportunity to lengthen the rotation with the object of producing larger sized material, which in the last 15 or 20 years has become increasingly valuable. Assuming that the Vesulian law (that the volume production varies as the square of the age) holds for trees between 20 and 30 years old, calculations indicate that the net revenue will be three or four times as great at 25 as at 20 years of age. The longer rotation is also preferable from a silvicultural point of view since the short rotations commonly in use have impoverished both soil and stands.—*S. T. Dana.*

2012. De la Hamelinaye, H. **De l'utilité et de la tenue des calepins de balivage. [Usefulness and preservation of staddle notebooks.]** Rev. Eaux et Forêts 57: 200–201. 1919.—Staddle notebooks should always be preserved since they often contain much information of the greatest value, particularly when they cover two or three rotations. The only difficulty in using them lies in the fact that the classifications used, which should always be clearly noted in the notebooks themselves, have varied from time to time. This is particularly serious when the staddle has not been regarded as limited to seedlings of the same age as the coppice, but as including all seedlings of a given size irrespective of their age. This practice, which is now becoming common, is open to serious objection, since it frequently leads to inability on the part of forest officers to determine to which rotation a given tree belongs. The result is that when it is necessary to choose between retaining a young standard of the same rotation as the coppice and another of the previous rotation, the latter is usually chosen in spite of the fact that its future growth will be decidedly less.—*S. T. Dana.*

2013. De Jong, A. W. K. **Tapproeven bij Hevea brasiliensis. [Tapping experiments on Hevea brasiliensis.]** Arch. Rubbercult. Nederlandsch. Indië 3: 1–6. 1919.—Results of 5½ years of tapping experiments: One left cut 1.60 m. high on a third tapped twice daily gives less latex than other systems of tapping. One left cut 1.10 m. high on a quarter tapped twice daily and three left cuts at a distance of 50 cm. on a quarter tapped twice daily give less than the following three methods: Two left cuts on a quarter at a distance of 50 cm. tapped daily, two left cuts on a third at a distance of 75 cm. tapped daily, and two left cuts on a third beginning at 85 cm. height, one going upward and the other as usual, tapped daily. The last three methods give practically the same yield. One left cut on each of two opposite quarters at 1.10 m. height tapped daily gives 30 per cent more rubber than the three last mentioned. Results of 18 months experiments show tapping from left to right has an advantage in yield of 14 per cent over similar tapping from right to left.—*W. E. Cake.*

2014. De Vries, O. **Invloed van enkele chemicalien op de innerlijke eigenschappen van den rubber. [Influence of certain chemicals on the inner qualities of rubber.]** Arch. Rubbercult. Nederlandsch. Indië. 2: 67–104. 1918.—A review of experiments with some of the chemicals most commonly used in the preparation of rubber from Hevea latex, viz: anti-coagulants, sodium sulphite, formaldehyde, and sodium carbonate; anti-oxydants, sodium bisulphite and thiosulphate; the closely related substances, sodium acetate and sulphurous acid. Sodium sulphite is placed in the front rank as an anti-coagulant by the fact that it causes a small but decided improvement of the rubber in tensile strength, a diminution of the standard time of cure and of the slope of the stress-strain curve, and an increase in viscosity index. Formaldehyde has just the opposite effect. Sodium carbonate has little effect. The effects of sodium bisulphite on the rubber are good. Thiosulphate in general has negligible effects. In making the usual types of plantation rubber, crepe and smoked sheet, acetic acid is used as a coagulant. In the case of three of the substances examined, sodium sulphite, bisulphite, and thiosulphate, interaction with acetic acid yields two common reaction products, sodium acetate and sulphurous acid. Sodium acetate increases rate of cure and viscosity; improvement in tensile strength and viscosity, if actual, are very small. Sulphurous acid, as a coagulant, has a favorable influence on the inner qualities of the rubber, as compared with acetic acid, and shows a small increase in tensile strength and viscosity, a marked decrease in slope of the stress-strain curve, whilst the rate of cure remains

the same. From these data it is clear that the increase in rate of cure caused by sulphite and bisulphite is due to the subsequent formation of sodium acetate. On the contrary, the decrease in the slope of the stress-strain curve (improvement) must be caused by the sulphurous acid. Since both sodium acetate and sulphurous acid increase the tensile strength and viscosity, sulphite and bisulphite must of course do likewise.—*H. H. Bartlett.*

2015. De Vries, O. **Invloed van verandering van tapvlak op latex en rubber.** [**Influence of the change of tapping surface on the latex and rubber.**] Arch. Rubbercult. Nederlandsch-Indië **3**: 130–138. 1919.—In *Hevea*, the change of tapping system or the change of tapping surface when accompanied by change of tapping system has great influence on composition of latex and properties of rubber. Opening a tapping cut on trees that have been resting for some time, or opening a tapping cut on untapped trees gives a latex of high rubber content and a rubber of very small rate of cure. However by merely changing to a new tapping surface in bark that has had a period of rest while the whole tree with its coherent system of latex vessels has not been at rest, no latex of especially high rubber content is obtained, although latex from such a surface often shows phenomena ordinarily accompanying opening of a new cut; viz., tendency to oxidation (violet color), or yellow color of latex.—*W. E. Cake.*

2016. De Vries, O. **Latex en rubber van onder- en bovensnede.** [**Latex and rubber from upper and lower cut.**] Arch. Rubbercult. Nederlandsch. Indië. **3**: 124–129. 1919.—A comparison of the properties of the latex and rubber from the upper and the lower cut when tapping with two left cuts on one quarter. Data show that latex from each of two cuts is nearly identical in all important characteristics. The greatest variation lies in the time of cure where the product from the upper cut has a slightly shorter period.—*W. E. Cake.*

2017. Dixon, H. H. **Mahogany and the recognition of some of the different kinds by their microscopic characters.** Notes Bot. School Trinity Coll. Dublin **3**: 3–58. *23 pl.* 1919.—The structure of the wood of 45 species is described and each is illustrated by photomicrographs. A key to these species based on microscopical characters is also given.—*G. B. Rigg.*

2018. Etter. **Zusammenhänge zwischen Bestandeslagerung und Schneedruck.** [**The relation between locality of stand and snow damage.**] Schweiz. Zeitschr. Forstwesen **70**: 166–167. 1919.—During the months of March and April, 1919, there was heavy snow damage noted in a stand of Scots pines 30 to 60 years old. This stand was on a slope to the south and west of an older stand of timber. The snow in this locality usually comes from the south and west and causes an exceptionally deep snow in the lee of this larger forest. A young stand can not resist this heavy snow on account of its smaller stem and weaker root system. This combination of conditions results in the heaviest snow damage that has been noted. This condition extended over a region of about 30 acres.—*J. V. Hofmann.*

2019. Fernow, B. E. [Rev. of: Zon, Raphael. **Reconstruction and natural resources.** Jour. Political Econ. 27: 280–299. 1919.] Jour. Forestry **17**: 598–600. 1919.—The regulation of the national forests so as to provide homes for 300,000 families should be begun at the present time, developing permanent yields wherever possible. Intensive development in community settlement is needed at this time and is offered by real forestry.—*E. N. Munns.*

2020. Flury, P. H. **Bodenverbesserungen oder Waldrodungen?** [**Soil improvement or forest management?**] Schweiz. Zeitschr. Forstwesen **70**: 117-124. 1919.—The article discusses the possibilities of improving forest land through forest management and by artificial means such as drainage and irrigation. The author states that 25 per cent of the forest land of Switzerland is unproductive with possibilities of improvement. He advocates that the soil can be greatly improved by proper management of different species; that swamps can be made productive through drainage, and arid lands can be irrigated. In round numbers there are possibly 140,000 hectares which are possible forest land. Work upon this basis

from 1885 to 1912 brought 34,117 hectares into forest production at a cost of 15.64 million francs. This was divided in approximately the following proportions: four-fifths for drainage, one-twelfth for irrigation, and the remainder for improvement cuttings. [See next following Entry, 2021.]—*J. V. Hofmann.*

2021. FLURY, P. H. **Bodenverbesserungen oder Waldrodungen?** [**Soil improvement or forest management?**] Schweiz. Zeitschr. Forstwesen **70**: 139–155. 1919.—The federal forest laws of Switzerland, passed in 1902, provided that the forest area must not be reduced. This provision was made because it was found that the forest area was too small to supply the demand and provide for continuous forest industries. The method of clear-cutting has always been discouraged because it resulted in nonproductive land being left without a forest crop. The unprecedented demand for agricultural land during the world war caused further laws to be passed providing for the replacement of forests and their protection. The increased cost of labor is a decisive factor at the present time and is a strong argument for bringing the forests to their highest state of production. The author gives figures which show that 13 days' labor per hectare per year are required to produce a mixed stand 25 years old, also that a cost of 20 days' labor is required to prepare the soil and stock a stand. He gives other specific instances which are below and above these figures. The contention is that the forest should be extended to the level as well as the hilly country to be used as a protection forest against severe climatic conditions and to moderate the climate to favor the agricultural crops. [See next preceding Entry, 2020.]—*J. V. Hofmann.*

2022. FORBES, R. D. **A forest policy for Louisiana.** Jour. Forestry **17**: 503–514. 1919.—Louisiana embraces 28 million acres, 25 per cent of which are in use now, 84 per cent of which are arable, and 16 per cent of which are best suited for forests. Conditions in each of the natural vegetative regions are summarized. The forestry department is to work for the acquisition and management of true forest lands, fire protection of the pine forests, and the encouragement of forestry in woodlots in the agricultural region and in timbered areas on large tracts of privately owned lands.—*E. N. Munns.*

2023. GRAVES, HENRY S. **Farm woodlands and the war.** U. S. Dept. Agric. Yearbook **1918**: 317–327. 1919.—The demands of war for boxes, crates, and containers and the special demand of hardwoods for specialized purposes, brought out clearly the importance of the farm woodlot. Walnut, ash, hickory, and other invaluable hardwoods do not grow in great massed forests but are mixed and scattered over wide areas and are in the hands of small owners. Black walnut for gunstocks and aeroplane propellers, black locust for tree nails, chestnut for tanning, ash and hickory for tools and vehicles, oak for ships and wood for acetone and alcohol; all had to come from the woodlots scattered through the country. This market developed by the war is bound to keep up as the industries using such lumber are peace industries with a great future. Woodlots should be improved and waste land should be set out in these valuable trees. Farm forestry should become an appealing practical business proposition.—*C. J. Shirk.*

2024. HARPER, ROLAND M. **A forest reconnaissance of the Delaware peninsula.** Jour. Forestry **17**: 546–555. 1919.—The Delaware peninsula, embracing Delaware and part of Virginia and Maryland is divided into five regions based on geological structure and soil differences which are described according to the tree growth, and for each region a tree census was compiled.—*E. N. Munns*

2025. HARTJENS, J. C. **Onderzoek naar de practische bruikbaarheid van een nieuw apparaat ter bepaling van het rubber-gehalte van latex.** [**On the use of a new apparatus for the determination of the rubber content of latex.**] Arch. Rubbercult. Nederlandsch-Indië **3**: 77–104. 1919.—A long article on the description, use, and the results obtained with a new and complicated colorimetric apparatus to determine the rubber content of *Hevea* latex. Results show that at present the apparatus is of little value in determining the rubber content of latex, and the use of the apparatus in factories on rubber estates is pronounced impractical because it demands too careful handling and the utmost cleanliness.—*W. E. Cake.*

2026. Herrman. **Die Keimungsenergie des Kiefernsamens in Theorie und Praxis. [Germination-energy of pine seeds in theory and practice.]** Naturw. Zeitschr. Forst- u. Landw. 17: 53–57. *Pl. 1–2.* 1919.—Haack's well-known views on germination tests, and especially his "germination-energy" measure of the value of seeds for planting purposes are reviewed. It is pointed out that in practice the number of seedlings secured may not, necessarily, be proportionate either to the "germination-energy" or the final germination as established under controlled conditions, and that many conditions external to the seed may affect the nursery or field result more potently than the quality of the seed, or the depth of covering, the factors which are evidently most important in tests. In peculiar circumstances the germination which, in a test, would occur within the first 10 or 15 days, may not survive, but may be replaced by that which would either in the germinator or elsewhere occur later and under more favorable circumstances. Two instances are cited in which very good nursery stands were secured after the seed had lain in the ground the whole of an unfavorable season. The writer, however does not attempt to say that this "hold-over" germination, which is not uncommon with the pines, represents entirely the seed which under test conditions would have been the last to germinate.—*C. G. Bates.*

2027. Hesselman, Henrik. **Naturforskningen och de skogsbiologiska problemen. [Natural research and the forest biological problems.]** Skogsvårdsfören. Tidskr. 17: 3–11. 1919.

2028. Hesselman, Henrik. **Studier över de norrländska tallhedarnas föryngringsvillkor. II. [Studies of natural reproduction in the pine heaths of Norrland.]** Skogsvårdsfören. Tidskr. 17: 29.76. *16 fig.* 1919.—In portions of Norrland, Sweden, the pine forests (*Pinus sylvestris*) reproduce themselves with such difficulty as to cause serious concern among foresters. The ground is usually covered with a dense mat of lichens, mainly *Cladina alpestris*, which grow to a height of more than a decimeter. The lichen mat apparently does not seriously interfere with germination because young seedlings are abundant. They do not, however, develop normally and soon die. Earlier investigations which Hesselman has carried on for more than 10 years have shown that death is not due to drought, lack of light, grazing, snow pressure, or competition with brush and lichens. Numerous chemical analyses have shown that wherever the pine seedlings develop normally the soil contains a noticeably higher per cent of available nitrates than where they are of poor development. The conclusion, therefore, is that available nitrogen in the soil is the critical factor. The presence of decaying wood or leaves when mixed with the mineral soil seems to promote nitrification. Seedlings grow much better near older trees, stumps and decaying logs than in the open. Experiments of 10 years standing have shown a marked improvement as a result of mixing sod with the soil, or even merely stirring up the soil with a hoe. Similar results are often observed after logging operations in which the surface layer of organic matter is mixed with the soil, thus promoting nitrification.—*G. A. Pearson.*

2029. Hill, M. **Report of the forest administration of the Central Provinces, 1917–18.** *96 p.* Nagpur, British India, 1919.—The comprehensive detailed annual report with tabular statements covering the forest operations in the Provinces during the year. Out of the total area of state forest of 19,649 square miles 85 per cent with an area of 16,544 square miles has approved working plans. No working plans are considered necessary at the present time for an area of 2503 square miles. Included in the research projects is the scientific cultivation of tarwad (*Cassia auriculata*), for tanning purposes, which grows wild in certain parts of the Provinces. A tannin research laboratory is in operation at Maihar. Due to the war's demand the scientific production of lac has also been undertaken and plans made for propagating it on a more extensive scale. An officer will be placed especially in charge of the operations which will include a demonstration of improved methods to the lac growers. An example is given of replacement of inferior species of trees in the forests by more valuable trees, by pointing to the promising results obtained by sowing sandal in the Akola Division. The need is indicated of investigating the utilization of myrabolan (*Terminalia chebula*) which is of great importance in the tanning industry. In the Southern Circle the

sowing of sal under the protection of telia (*Wendlandia exserta*) was continued. *Cinnamommum camphora* sowings were made in frost holes in the Bilaspur Division with the object of protecting the young sal. Sixty-eight thousand, six hundred and seventy-nine acres were exploited under the coppice with standards system against 62,037 acres the preceding year. Mechanical tests showed that Allapilli teak differed but little from Burma teak, the latter having a slight advantage in transverse strength and the former in shearing and compression strains. Chanda teak is said to be valuable for ornamental purposes and in furniture and panel work as it takes a smooth finish.—*E. R. Hodson.*

2030. Holmes, J. S. **The forests of North Carolina.** Bull. North Carolina Dept. Agric. **40**[6]: 12–13. 1919.—Brief statement of forest resources and policies in North Carolina with outline of plan to promote conservation.—*F. A. Wolf.*

2031. Horton, Robert E. **Measurement of rainfall and snow.** Monthly Weather Rev. **47**: 294–296. 1919.—The object of this paper is to describe methods of measuring rainfall and snow and to discuss the errors and inaccuracies of such measurements, with the view of suggesting methods of securing rainfall records with the highest possible degree of accuracy and usefulness. Some attention is given to the question of reliability of results obtained from a single raingage as applied to the larger or smaller area around it.—*Robert E. Horton.*

2032. Joshi, Shambhoo Datt, and others. **Annual report on the forest administration in Ajmer-Merwara for the year 1917–1918.** *26 p.* Ajmer, India, 1919.—A routine report on forest operations in the province with financial statement. Covers changes in forest areas, management, protection, silviculture, planting, research, and experiments, in brief summaries.—*E. R. Hodson.*

2033. Klason, Peter. **Kolning och torrdestillation av ved och därvid framställbara produkter. [Charcoal burning and dry distillation of wood, and the resultant products.]** Skogsvårdsfören. Tidskr. **17**: 125–190. *37 fig.* 1919.

2034. Latham, H. A., and others. **Administration report of the forest department of the Madras Presidency, 1917–18.** *147 p.* Madras, British India, 1919.—Annual report for the province covering forest operations, with detailed tabular statement. The area of reserved forests increased to 18,838 square miles and the total area of reserved forests and reserved lands at the close of the year was 19,506 square miles. Approved working plans cover an area of 8259 square miles. The areas under the various sylvicultural systems were as follows: clear felling, 130 square miles; selection felling, 1016 square miles; simple coppice, 690 square miles; coppice with standards, 1807 square miles and improvement felling, 1224 square miles. Large quantities of the bark of *Anogeissus latifolia* were supplied to the Munitions Board for tanning purposes. This is a new discovery made in the Madras Leather Trade School. The leaves of this tree are also a valuable tanning material. Experiments in the inoculation of *Butea frondosa* and *Zizyphus xylopyra* with lac culture are being made by the Government Entomologist in the Central Coimbatore Division.—The outstanding feature of the work of the Forest Department, during the year, was the varied activities designed to meet the demands of the Military Department. Large supplies of hay and tanning stuffs were procured for the Munitions Board and the department did a great deal to increase the supply of timber required for war purposes.—*E. R. Hodson.*

2035. Lie, Haakon. **Fjeldskogen. [Mountain forests.]** Tidsskr. Skogbruk **27**: 145–190. 1919.—The author seeks to awaken the public and foresters to greater appreciation and care of the more elevated forested lands in Norway. The introduction deals with general requirements of the trees and plants, relative importance of the climatic factors, the abundance and distribution of trees in different parts of the country, the characters, peculiarities and functions of the mountain forests in particular. A discussion follows bearing on the present lower altitudinal limit of the forest than in earlier times. This is explained on the ground of a warmer climate evidenced by shellfish which now live farther south in Europe

and the fact that the country lay 50 meters lower after the recession of the glaciers. The value of different native species of trees for use in the higher forests is considered; of these Norway spruce appears best adapted since it reproduces better in the upper regions than other trees, protects the ground better, and withstands climatic conditions better. Recommendations for cutting and enactment of laws for better care of these forests are given.—*J. A. Larsen.*

2036. LJUNGDAHL, GUSTAF S. **Om kompassens missvisning. [Concerning misdirection of the compass.]** Skogsvårdsfören. Tidskr. 17: 191–198. *5 fig.* 1919.

2037. LUNDBERG, GUSTAF. **Om prissättningsenheter vid arbeten och handel med stubbved. [Price standards in work and trade in stump wood.]** Skogsvårdsfören. Tidskr. 17: 77–94. *9 fig.* 1919.

2038. MACDONALD, A. F. **Mexico as a source of timber.** Amer. Forestry 25: 1361–1362. *1 map.* 1919.—Mexico may conveniently be divided into three districts; first, the great tropical forest belt, covering almost the entire peninsula of Yucatan, as well as the small states of the southeast which border on the Gulf of Campeche; second, the temperate zone forest belt, located in the northwestern section of the Republic, and extending northward almost to the American border; and between these two districts is the treeless belt, some of which is cultivated, but much of which is arid. The tropical forest belt yields logwood and other dye woods, mahogany, ebony and other precious woods and Spanish cedar. Pine is the commercially important timber of the temperate zone forest belt, the principal varieties of which, in the order of importance, are yellow short leaf, yellow long leaf and Weymouth; spruce and fir occur in quantity, together with some oaks, cedars and other hardwoods.—*Chas. H. Otis.*

2039. MCINTOSH, R. **Progress of forest administration in the Punjab, 1917–18.** *64 p.* Lahore, British India, 1918.—The total area under the management of the Forest Department increased from 7211 square miles to 7074 square miles mainly due to areas released for colonization in the Chenab and Multan Divisions. The Jallo factory produced 16,426 maunds (maund = 80 pounds) of rosin and 46,709 maunds of turpentine. The future prospects of the industry in the Punjab are exceedingly bright. During the past year only 14,521 acres of forest were tapped, but it is estimated that with the early removal of the chief obstacles to progress (i.e., scarcity of labor, lack of staff, and difficulties connected with transport from forest to railroad shipping point) tapping operations could be extended at once to about five times this area in the Punjab and North-West Frontier Province, and that the yield of rosin and turpentine could be increased in similar proportion. This estimate excludes tappable areas in Jammu, Kashmir, Chamba and other native states. The Imperial Forest Botanist investigated the spread of *Fomes lucidus* in the irrigated plantations and made suggestions for combating it. The ravages of *Trametes pini* in the hill forests continue and no remedy is apparent. Self-sown khair (*Acacia catechu*) is reported to be spreading in Kangara; and the regeneration of *Prosopis glandulosa* in the Pabbi continues to be good. In the bamboo forests there is little reproduction by seed, but the production of shoots is generally sufficient. In Kangara the coppice of bam oak (*Quercus incana*) is reported to be excellent. Experiments show that coppice felling of this oak can be made at any season of the year without causing any discernible difference in the vigor of the shoots, and they further show that since practically all the shoots come from dormant buds and not from the cambium layer, dressing or trimming the stumps is unnecessary. In Lahore the experiments for determining the fertility of shisham seed obtained from coppice shoots, and the efficacy of early thinnings in irrigated plantations are being continued. Of the various exotics tried at *Dharamsala*—Spanish chestnut, *Cryptomeria*, *Robinia*, *Acacia dealbata* and camphor—none are successful. *Robinia* continues to do very well in Simla. It is particularly useful for clothing unstable slopes where excessive weight of trees is undesirable. The various species which were tried in Changa Manga as substitutes for shisham standards were all frozen down and failed completely.—*E. R. Hodson.*

2040. Mårn, L. Mattsson. **Några synpunkter på variations- och korrelations-beräkningar. Med anledning av Sven Petrinis undersökning: "Form-punktsmetoden och dess användning för formklassbestämning och kubering." [Some views regarding mathematical variations and correlations, with reference to Sven Petrini's investigation: "The form-point method and its use in determinations of form-class and volume."]** Skogsvårdsfören. Tidskr. **17:** 109–122. *1 fig.* 1919.

2041. Mer, E. **Influence de la dimension des arbres sur l'efficacité des éclaircies. [Influence of size of trees on results of thinning.]** Rev. Eaux et Forêts **57:** 141–146, 165–175. 1919.—Two sample plots in a stand of fir about 60 years old and averaging respectively 9.3 and 11.2 cm. in diameter, were thinned in 1886 and again in 1899. Careful records of growth which were maintained until 1911 showed that the increased growth resulting from the thinnings was uniformly greater both in diameter and volume in the smaller trees. This difference is probably due to the fact that the smaller trees were younger and therefore more vigorous than the larger trees. While further investigation is needed to determine how generally applicable are the results of this experiment, two conclusions may be drawn from it,—(1) that sample plots to study the effect of different degrees of thinning should be composed of trees of as nearly as possible the same size; (2) that as a rule thinnings may be profitably undertaken at an earlier age than is now customary.—*S. T. Dana.*

2042. Mongenot. **L'epicea et la sêcheresse. [The spruce in relation to dryness.]** Compt. Rend. Acad. Agric. France **5:** 713–715. 1919.—Discusses the relation of the spruce to the water supply and shows how it is this factor that limits the altitude below which this tree cannot be planted in the south of France, since the rainfall decreases as one descends.—*E. A. Bessey.*

2043. Myhrwold. **Den svenske statsskogforvaltning aar 1917. [Review of the Swedish government forest report for 1917.]** Tidsskr. Skogbruk **27:** 202–208. 1919 —The total area within designated forest land in Sweden is given at 22,398,195 hectares. Of this the Government owns 6,070,230 hectares and maintains supervision over 2,640,704 hectares in the hands of different state institutions. 3,757,109 hectares of the Government owned land is considered productive forest area. The Government maintains seven forest schools and one forest school of higher training. The permanent and temporary personnel consist of 1556 men, all of whom have passed the required exams. 505 men make up the permanent force. In 1917 the Government sold from its holdings, 4,189,694 cubic meters (m^3) of miscellaneous forest products at a total receipt of 38,422,635 crowns. During the same year the sum total of the expenditures amounted to 12,273,689 crowns. The net receipt was therefore in the neighborhood of seven million dollars. Only 1.200 hectares burned over in 1917. (One crown is about 28 cents, and one hectare is 2.47 acres.)—*J. A. Larsen.*

2044. Nordstedt, C. T. O. [Swedish Rev. of: Hasselman, H. **Iaktagelser öfver skogsträdens spridningsförmåga. (Observations on the power of distribution of forest trees.)** Medd. Statens Skogsförsöksanst. **16:** 27–66.] 1919.] Bot. Notiser **1919:** 167–168. 1919.—See Bot. Absts. 4, Entry 232.

2045. Opsahl, Waldemar. **Indtryk fra en studiereise gjennem de danske skoge. [Impressions from a trip through the Danish forests.]** Tidsskr. Skogbruk **27:** 209–221. *5 pl.* 1919.—Most foresters know of the success reached in afforesting the barren heaths of Jutland, Denmark, but few have realized the years of experimentation, and the unflinching faith and courage of those who fathered this project. Though several companies, which had been promoted for reforesting the dunes, had failed, Enrico Dalgas became convinced that it could be done and gave himself and his fortune to the work. The company which he organized has successfully reforested 80,000 hectares and the Danish Government 50,000 hectares. The work began about 50 years ago, and at the present time only forty per cent of the total waste area remains unreclaimed. One 55 year old stand of Norway spruce, planted where nothing but worthless brush grew, yielded 3950 cubic feet per hectare. The work is done as

follows: The heath is burned, then plowed and disced and allowed to remain thus three years, plowed again a little deeper and in a manner to break up all roots and again left for 2 years. This process brings about aeration, bacterial life decomposition and formation of humus. In some places lime and phosphoric acid are plowed under in the fall. A species of scrub pine is planted with one of Norway spruce to two of pine. The pine requires very little air and soil moisture, aids in formation of humus and protects the spruce.—*J. A. Larsen.*

2046. Pammel, L. H. **Effect of winter on shrubs at Ames, Iowa.** Rept. Iowa State Hortic. Soc. **53**: 39–41. 1918.—See Bot. Absts. 4, Entry 868.

2047. Parnell, Ralph, and others. **Progress report on forest administration in the North-West Frontier Province for the year 1917–18.** *15 + xxi p.* Peshawar, India. 1918. —A routine report on forest operations in the province. There was a marked increase in the out-turn of timber, and the departmental exploitation of wood fuel and charcoal also increased materially. A total of 12,716 cubic feet or timber and fuel per square mile was produced, or nearly double that of the next provincial competitor (Bihar & Orissa). The financial results indicate that a vigorous commercial forest policy is desirable.—*E. R. Hodson.*

2048. Petrini, Sven. **Om uppskattning av höjdtillväxten å stäende träd. [Calculation of height growth of standing trees.]** Skogsvårdsfören. Tidskr. **17**: 19–24. 1919.

2049. Record, Samuel J. **Storied or tier-like structure of certain dicotyledonous woods.** Bull. Torrey Bot. Club **46**: 253–273. 1919.—See Bot. Absts. 3, Entry 2442.

2050. Rolfe, R. A. **The true mahoganies.** Kew Bull. **1919**: 201–207. 1919.—Commercial planting of mahogany trees in the West Indies in recent years has made it necessary to establish taxonomically the various species. The original mahogany is *Swietenia mahagoni,* a tree known in the West Indies for more than three centuries and often called Spanish Mahogany, but in recent years the term mahogany has been extended to include various red-brown timbers belonging to this and other genera of the family Meliaceae and in part to other families. The present paper is an account of the history and botanical features of *Swietenia mahagoni, S. humilis* and *S. macrophylla.*—*E. M. Wilcox*

2051. Rutgers, A. A. L. **Selectie en uitdunning. [Selection and thinning.]** Arch. Rubbercult. Nederlandsch-Indië **3**: 105–118. 1919.—Article emphasizing the necessity of a systematic selection of rubber trees for size and high latex yield, and also the removal of a large number of practically valueless trees on the plantations of Sumatra and Java and Ceylon. Selection may be made by collection of seeds from superior seed trees or by propagation through budding. Data is given to show that in thinning out from 15 per cent to even 75 per cent of the trees on the plantations the yield is not reduced but either remains constant or is increased.—*W. E. Cake*

2052. Sampson, Arthur W. **Suggestions for instruction in range management.** Jour. Forestry **17**: 523–545. 1919.—The forester must have a thorough knowledge of the livestock business and the subjects which would give the student an insight into range management are described as to application, ground to be covered, related topics and usefulness. The subject matter is discussed under seven heads for the grazing course proper, and for related topics. The type of man and the character of the work are portrayed.—*E. N. Munns.*

2053. Sanford, F. H. **Progress in blow sand control.** Michigan Agric. Exp. Sta. Quart. Bull. **1**: 130–131. Feb., 1919.—A brief account of some experiments begun in 1916 to control the blowing of sand on the dunes along Lake Michigan, using cuttings of Carolina poplar and basket willows set in belts to form temporary sand catchers, supplemented by barriers of beach grass.—*E. A. Bessey.*

2054. Schädelin, W. Wirtschaftliche Zuchtwahl? [Practical selection.] Schweiz. Zeitschr. Forstwesen 70: 101–103. 1919.—The author discusses the questions whether selection should be based on simply selecting the best of the present stand or whether the stand should be improved by breeding and selection. In order to apply selection intelligently the characters of the parent tree must always be considered. In this connection any seed study must take into account both the staminate and pistillate tree. This, naturally, involves a long term study extending through several generations of the trees to be taken as a basis. In improving a forest by selection it is always desirable to choose trees which have been in a given locality for several generations. By using trees of this class which are desirable the characters are more nearly perpetuated than by the introduction of foreign characters into a different locality. In regions where the natural forests have been perpetuated for several generations and the characters have become fixed to a large extent, clear cutting methods have destroyed the forests completely and have been replaced by artificial methods and plants of foreign characters have been introduced. The author points out that different qualities of different species, such as the twisted grain of the spruce, the crenate structure of the wood, liability to frost and other factors which apply more or less to hard woods and conifers, must all be taken into consideration in developing the forest. Seed studies have not gone into sufficient scientific detail to give definite data on these characteristics. The author takes exception to Professor Engler's work on seed studies because in these studies only the staminate parent tree was considered. He contends that the weather influence on the seed extends through two seasons, usually the season of flowering and the season of maturity. These factors as well as all environmental factors must be considered. In conclusion he states that selection must either be done to improve the next stand or selection breeding undertaken to improve and fix the improved characters in the future stand.——*J. V. Hofmann.*

2055. Sibbern, Georg. Fra en reise i Frankrike. [From a trip to France.] Tidsskr. Skogbruk 27: 191–199. *4 pl.* 1919.—The author describes briefly several natural and planted forests in France and the tract in the war-zone to be reforested by the Norwegian Government in greater detail.—*J. A. Larsen.*

2056. Siecke, E. O. Texas forest facts. *16 p.* Office of State Forester: College Station, Texas. 1918.—The pamphlet is devoted to forest statistics for Texas. The present annual returns from the farm woodlands of the state amount to $12,000,000. There is included an interesting table giving the ratio of forest area to forest appropriation in 14 representative states. There follows a discussion of the activities of the State Forester and possibilities for development.—*James B. Berry.*

2057. Skvortzow, B. W. Notes on the agriculture, botany and zoology of China. Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 2462.

2058. Sterling, E. A. Mandatory control opposed. Amer. Forestry 25: 1339–1340. 1919.—(A contribution to the general topic "A national forest policy.") It is the opinion of the writer that under the existing political and economic situation a policy aimed at the mandatory acquirement of private lands will fail: (1) because the public has not been convinced that it is necessary; and (2) for the reason that sufficiently strong opposition would immediately develop to not only defeat such a policy, but to jeopardize any forest policy.—*Chas. H. Otis.*

2059. Thelen, Rolf. Aerial photography and national forest mapping. Jour. Forestry 17: 515–522. *1 pl.* 1919.—The use of the airplane in forest administration and mapping is described, and its limitations are set forth in detail for various forest activities.—*E. N. Munns.*

2060. Ten Houte de Lange, W. G., Jr. **Rubberproductie-krommen. [Rubber production curves.]** Arch. Rubbercult. Nederlandsch-Indië **2**: 105–111. 1918.—This paper presents data and curves showing the falling off in latex production during the so-called "wintering" of Hevea. The latex flow diminishes when the tree begins to lose its leaves, and increases again as the new leaves expand. Production reaches a minimum, on the estate where the data were obtained, in late July and early August. The curve, however, shows a secondary fall in February and March, which the author explains on the basis of local practice with regard to change of the tapping cut. He also suggests that the ripening of the seeds during this period may have something to do with the matter.—*H. H. Bartlett.*

2061. Tireman, H. **Progress report of forest administration in Coorg for 1917–1918.** *15 p.* Bangalore, India. 1919.—A routine annual report. In an experiment to determine what species of evergreen or semi-evergreen trees and shrubs are most suitable for shading the soil in the dry forests of North Coorg the following proved most successful: *Pongamia glabra*, 83 per cent survival, average height 6 feet; *Randia dumetorum*, 77 per cent survival, average height 9½ inches; *Eugenia jambolana*, 54 per cent survival, average height 2 feet. The seed was sown at *Banawara* in 1915.—*E. R. Hodson.*

2062. Trafford, F. **Annual progress report on forest administration in the provinces of Bihar and Orissa for the year 1917–1918.** *53 p.* Patna, India. 1918.—A routine report on forest operations in the province. It is stated that no progress was made in the problem of arresting the destruction of private forests in a certain division (Chota Nagpur). A number of applications for protection were received but none from a private proprietor. It is doubtful whether anything short of specific legislation will prove sufficient for the permanent preservation of privately owned forests which are a most important factor in the future prosperity of the country.—*E. R. Hodson.*

2063. Trägardh, Ivar. **Skogsinsekternas skadegörelse under ar 1917. [Damage by forest insects in 1917.]** Meddel. Statens Skogsförsöksanst. **16**: 67–114. *Pl. 1–14.* 1919.—The article gives a survey of the activities of various forest insects in Sweden during 1917. Among the insects discussed are the following: *Scolytus ratzburg, Ips acuminatus, Myelophilus piniperda* and *M. minor, Ips typographus, Bupalus piniarius*, and *Cephaleia signata*. A résumé is given in German.—*G. A. Pearson.*

2064. Van Heurn, F. C. **Natrium sulfeit analyses. [Sodium sulphite analyses.]** Arch. Rubbercult. Nederlandsch-Indië **3**: 7–16. 1919.—The superiority of sodium sulphite as an anti-coagulant for *Hevea* latex is shown by citing various articles published on this subject. Its anti-coagulant properties are due to the alkalinity of a solution of sodium sulphite. Sodium sulphite has the added advantage of giving disinfecting sulphurous acid on being treated with the acetic acid used for the coagulation of the latex,—hence the growth of microörganisms and the development of air blisters is made impossible. On account of much adulterated and valueless material sold as sodium sulphite, planters are urged to use only the analyzed product. Results on the analyses of 19 different commercial grades of the sulphite are tabulated.—*W. E. Cake.*

2065. Von Greyerz. **Das Hagel-, Ton- oder Mändliholz. [Treadle-wood. The identification of spruce (Picea excelsa, Lk.)]** Schweiz. Zeitschr. Forstwesen **70**: 113–117. 1919.—The identification characters of spruce have been worked out in various ways, but no consistent characters have been found except in some of the varieties. The treadle-wood spruce appears only above an altitude of 1000 m., and the variety *chlorocarpa* is found above 1200 m. above sea-level. Previous investigations which give the color of the leaves, branching habit and bark characteristics have been found to be not always correlated with the wood structure. The characteristics become more definite and pronounced at the higher elevations. Crenations of the wood under the bark have been found as well-defined markings, but these vary in trees growing side by side.—*J. V. Hofmann.*

2066. von Tubeuf, C. **Schilderungen und Bilder aus nordamerikanischen Wäldern. Von Chicago zum Felsengebirge.** [Descriptions and views of North American forests: from Chicago to the Rocky Mountains.] Naturw. Zeitschr. Forst- u. Landw. 17: 1–44. *Pl. 18–53.* 1919.—Tubeuf presents, in a more or less personal manner, his impressions of American forests and other plant-formations, gained during a tour in 1913. The present article, the second of a series, deals with the region indicated by the sub-title. Conditions in the vicinities of Chicago, Lincoln and Akron (Colorado), are dealt with briefly, but greater space is given to the mountain flora, with special reference to the Pike's Peak region of Colorado. The localities of Minnehaha, the Garden of the Gods, the Peak proper, and the Fremont Experiment Station, are described in considerable detail. Almost every forest and herbaceous species of the region is mentioned. A lengthy description is given of the "blue" Douglas fir typical of this region, which the author calls *Pseudotsuga glauca.* The article is replete with comments, but reaches no important conclusions. Many of the illustrations are half-tones from original photographs by the author.—*C. G. Bates.*

2067. Waentig, P. **Zur Frage der Holzaufschliessung zu Futterzwecken.** [Wood preparation for fodder.] Naturw. Zeitschr. Forst- u. Landw. 17: 44–53. 1919.—A description of the progress made in the utilization of wood for fodder, mainly since 1916. Describes various theories as to the usefulness and availability of the food stored in wood, recognizing that stem- and branch-wood, on account of greater lignification, may have much less food value than leaves and twigs, which are eaten naturally by stock and have long been cured for fodder. Various means for making the nutrients available are described, of which the most successful process seems to be a combined mechanical and chemical treatment. Grinding or cutting, as in the preparation of paper-pulp, is of no avail because of the incomplete opening of the cells and the loss of nutrients through the watering which must accompany so intensive a mechanical process. As fodder, wood seems to be especially deficient in proteins, and must be supplemented by some rich food such as animal meal. Its similarity to straw, in this and other respects, is repeatedly mentioned. In spite of its deficiencies, it may be recommended, especially for work-animals, as the rougher part of the ration.—*C. G. Bates.*

2068. Wale, Bernard N. **The removal of hedgerows.** Jour. Bd. Agric. Great Britain 25: 1408–1424. 1919.—A plea is made for the removal of the too numerous hedgerows surrounding farm fields in England. The loss in land due to the space occupied by these hedges is considerable, being 6 per cent in square fields of $4\frac{1}{2}$ acres in size, and 4 per cent for 10 acre fields. There would be gain in many ways if the fields were enlarged from $4\frac{1}{2}$ acres, which is the average size in some localities surveyed, to 10 acres. Some data are given on the cost of removing the hedgerows.—*M. B. McKay.*

2069. Widegren, K. A., and E. H. **Transportbana för skogsdrift, system Widegren.** [A transportation system for forest freight, the Widegren system.] Skogsvårdsfören. Tidskr. 17: 199–211. *5 fig.* 1919.

2070. Wright, F. A. **A further note on thitsi (Melanorrhoea usitata).** Indian Forest Records 7: 75–88. *Pl. 1.* 1919.—The apparatus used in tapping thitsi and the methods employed are described. The yields per tree and per chisel are given in local terms, with data on the imports and uses of the oleo-resin derived. Suggestions are made for the regulation and control of thitsi-tapping on government lands.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

2071. Abe, A. **Goma no nisanno Keisitu no Iden Kenkyu Yohô.** [Preliminary note of inheritance studies on some characters of Sesamum indicum.] [Japanese.] Taiwan Nôzihô [Agric. Rept. Formosa] 153: 15–18. 1919.—Author made experiments on F_1 and F_2 hybrids between some races of *Sesamum indicum.* Seed-coats are white, black, or brown; it was found

that black is dominant to white as well as to brown, and the latter is dominant to white. The mode of segregation of these hybrids in F_2 was not yet definitely determined, but it is very probable that in all these hybrids plants with colored seed-coats and those with non-colored ones segregate out in the ratio 15 : 1. Hybrids were also made between races with branching and non-branching habit; between those with glandular and non-glandular capsules; and between those with bilocular and multilocular capsules; in each of these cases the first-named character was found to be dominant to the second, and all these hybrids were found to behave in F_2 as typical monohybrids.—*S. Ikeno.*

2072. Albertz, H. W. **Work of the Wisconsin Agricultural Experiment Association.** Wisconsin Agric. Exp. Assoc. [Madison] **1919**: 1–28. *21 fig.* 1919.—Outlines method of breeding and dissemination of pure-bred seed grains. Describes pedigreed varieties and gives brief history of same.—*H. K. Hayes.*

2073. Anonymous. **Dos nuevas suertes de guisante de los campos obtenidas por seleccion en descendencias puras en Noruega. [Two new types of field peas obtained by pure-line selection in Norway.]** Informacion Agric. [Madrid] **9**: 11–12. 1919.—See Bot. Absts. 3, Entry 1332.

2074. Anonymous [J. F.]. **Variability in plants.** Gard. Chron. **66**: 26–27. July 12, 1919. —Brief comment on the permanence of characters used in botanical classification in *Fuchsia* and similar genera.—*John Bushnell.*

2075. Anonymous. **The genetical society.** Gard. Chron. **66**: 38. July 19, 1919.—Editorial concerning the establishment of the Genetical Society (England). [See next following Entry, 2076.]—*E. W. Lindstrom.*

2076. Anonymous. **The genetical [society].** Gard. Chron. **66**: 44–45. July 19, 1919.—Report of the first meeting of the Genetical Society held on July 12, 1919, at Cambridge, England. Includes a general summary of the researches of Miss Saunders on stock (*Matthiola*) and of those of Professor Punnett on sweet pea (*Lathyrus*). [See next preceding Entry, 2075.] —*E. W. Lindstrom.*

2077. Anonymous. **The improvement of Freesias.** Gard. Chron. **66**: 95. Aug. 16, 1919. —Refers to article by Van Fleet in Jour. Internat. Gard. Club **3**. June, 1919. Author notes that until about 1816 only species in cultivation was *Freesia refracta*, with a rather tortuous, horizontal flower scape bearing five or more blooms, with bulging corolla lobes of lurid greenish color, with a pronounced orange blotch. Forty years later florists had succeeded in producing a greatly improved flower which was nearly pure white with a deep yellow blotch, known as *F. refracta alba*, which became the usual garden variety. Later *F. Leichtlinii* was discovered in an Italian nursery. It was a strong growing plant with well shaped blooms, of color varying from sulphur to deep yellow, with deep orange blotch. From this the golden yellow variety, *F. Chapmanii* was developed. Other crosses and selections show how the type of this plant has departed from that which it originally held. [See Bot. Absts. 3, Entry 2207.]—*C. E. Myers.*

2078. Anonymous. **The improvement of the yield of Sea Island cotton in the West Indies by the isolation of pure strains.** Agric. News [Barbados] **18**: 125. 1919.—Synopsis of paper with same title, by S. C. Harland.—See Bot. Absts. 3, Entry 35.—*T. H. Kearney*

2079. Arny, A. C., and R. J. Garber. **Field technique in determining yields of plats of grain by the rod-row method.** Jour. Amer. Soc. Agron. **11**: 33–47. *2 fig.* 1919.—Rectangular plots of grain 2 by 8 rods in size which had received various fertilizer treatments were sampled by taking out rod-rows at certain intervals distributed systematically over the plots. Yields as determined from entire plots were compared with those obtained from the corresponding rod-rows grouped in various combinations. From a statistical study of the data from three different fields it is concluded that for the conditions under which the work was done, 9 rod-rows removed from tenth-acre plots gave as accurate indications of the value of fertilizer treatments as harvesting the product of the entire plots. [See Bot. Absts. 3, Entry 165; 4, Entry 1133.]—*L. H. Smith.*

2080. Astley, Hubert D. **Hybrid Barraband and Queen Alexandra Parrakeets.** Avic. Mag. **10:** 212–213. 1919.—*Polytelis Alexandrae* ♀ mated to *P. barrabandi* ♂ produced two young, favoring the father in coloring. Both died before mature plumage was attained.—*J. L. Collins.*

2081. Bateson, W., and Ida Sutton. **Double flowers and sex linkage in Begonia.** Jour. Genetics **8:** 199–207. *Pl. 8.* June, 1919.—Double female flowers of *Begonia*, a monoecious plant with terminal male and lateral female flowers, pollinated by strain with only single flowers gave single generally dominant but segregation irregular and not clearly understood. Transitional forms appeared. An average of 1 double in 32 was obtained but many large families were without doubles and the figures are thought to have no general significance. Back crosses were also irregular. Authors noted that while doubleness is distributed genetically according to strict allelomorphic rules in other plants great irregularity prevails in *Begonia.* A pure-breeding single-flowered *Begonia Davisii* from Peru crossed on common doubles gave only double-flowered offspring contrary to usual behavior. Total of 405 plants grown with only 18 having less than complete doubling. Novel conclusion is reached that this pure single-flowered form is genetically all double on male side. Crosses between this Peruvian species and a horticultural type, *B. Lloydii,* having double male flowers which produce pollen, gave no clear indication of linkage of doubleness with sex except in the case of one F_1 plant. This individual self-fertilized gave only two plants, both singles. Pollinated by the single *Davisii* it gave 11 singles, and by the double *Lloydii* 5 singles and 1 slightly petalodic. Used as pollen parent it gave with *Lloydii* 27 doubles, 14 half doubles and 5 slightly petalodic. Hence the ovules at least were predominantly single-bearing. Sex linkage in *Petunia, Matthiola, Campanula* and *Oenothera* is also discussed.—*D. F. Jones.*

2082. Baur, Erwin. **Über Selbststerilität und über Kreuzungsversuche einer selbstfertilen und einer selbststerilen Art in der Gattung Antirrhinum. [On self-fertility and crossing experiments with a self-fertile and self-sterile species of Antirrhinum.]** Zeitschr. indukt. Abstamm. Vererb. **21:** 48–52. May, 1919.—The several species of *Antirrhinum* investigated varied in regard to self-sterility. *A. siculum* and *A. majus* were perfectly self-sterile. While *A. latifolium* and *A. tortuosum,* except for the occasional setting of seed late in the season, were sterile with their own pollen during their first year, they were self-fertile the next. An undetermined variety of the latter was self-sterile in the first generation but self-fertile in succeeding generations. *A. Ibanyezii, A. molle, A. glutinosum,* and *A. hispanicum* were self-sterile.—Hybrids between self-sterile species were all self-sterile. In hybrids between self-fertile and self-sterile species self-fertility is dominant, a 15 : 1 ratio resulting in F_2.—*E. S. Anderson.*

2083. Bayla, A. M. **Hybridization of eggplants.** Philippine Agric. **7:** 66–71. 1918.—Shows possibility of crossing native on foreign varieties, giving increased vigor in the hybrid. The hybrid is quite resistant to bacterial disease, but this character was lessened in the second generation. Commercial possibilities of the work are noted.—*C. E. Myers.*

2084. Becking, L. G. M. Baas. **Over getallenverhoudingen in panmictische populaties. [Numerical conditions in panmixial populations.]** Nederland. Kruidkundig Arch. **1918:** 61–69. May, 1919.—Genetic formulae are given or suggested for the Mendelian principles as applied to factors of human population. There is a discussion of the various formulae applied by previous writers with criticisms and the opinion of the author tends towards an expectation of results pointing to equilibrium of factors as inferred by deduction.—*J. A. Nieuwland.*

2085. Becking, L. G. M. Baas. **Some numerical proportions in pan-mictic populations.** Recueil Trav. Bot. Néerland. **15:** 337–366. *1 pl.* 1918. Panmictic populations are those in which mating between the different genotypes is free and unrestricted. Hardy showed that with one factorial difference a constant limit is reached in F_2. With more numerous factors the limit is reached only after numerous generations. Formulae are derived for these cases and it is

shown that: (1) A limiting population will be reached in all cases, which will thereafter remain constant; (2) The limiting population had the peculiarity that the homozygotes in it will be proportional to each other in pairs; (3) Such populations have other numerical peculiarities. The importance of these results to practical breeding is pointed out and a method formulated by which it is possible to derive immediately the limiting proportions in a population when the number of factors and the type of mating is known.—*L. Baas Becking.*

2086. Becking, L. G. M. Baas. **Over Limietverhoudingen in Mendelsche populaties. [Limiting proportions in Mendelian populations.]** Genetica 1: 443–456. *4 fig.* Sept., 1919.—Reviews papers by Jennings, Henkels, Wentworth & Remick, Hardy, Bruce, and Robbins. Formulae are derived and graphs constructed to homologize the work of these authors for: (1) Panmixia for 1, 2 and 3 factors (Hardy, Becking); (2) Autogamy for 1 or more factors (Jennings); (3) Combined allogamy and geitonogamy for 1, 2, and 3 factors (Henkels); and (4) Different forms of selective mating (Bruce, Robbins, Wentworth and Remick). From the formulae and graphs the limiting proportions in any population in which the type of mating is known can be easily and immediately derived. As shown by the graphs the rate at which the limits are approached varied widely with the type of mating.—*L. Baas Becking.*

2087. Beeson, M. A. **Report of agronomy department.** Oklahoma Agric. Exp. Sta. Rept. 1918: 14–22. 1918.—Progress report of selection experiments and variety tests with farm crops. States that improved seed distributed through Oklahoma Seed Growers' Association has materially increased yields and improved quality.—*H. K. Hayes.*

2088. Bhide, R. K. **Probable material for the study of the experimental evolution of Oryza sativa, var. plena Prain.** Agric. Jour. India 14: 494–499. 1919.—*Oryza sativa,* var. *plena* Prain, the "double-grain paddy" is a variety of rice cultivated in Bengal. Usually a certain proportion of the spikelets of the panicle contain from 2 to 5 grains each. Almost every spikelet has from 2 to 5 ovaries in the flowering stage. The number of well developed grains per spikelet is often only from 1 to 3; as probably all of the ovaries are not in a stage to be fertilized at the same time. In a plot of this variety, it was found in rare instances, that the topmost spikelets on a few branches of the panicle had only a single ovary with 4 or more stigmas, two or more ovaries being then united together. The number of stamens in each spikelet is usually 6, but in rare instances it was found to be 7 or 8, thus indicating a slight tendency in the stamens to increase their number. Sometimes the spikelets showed a tendency to increase the flowering glumes and pales. A few plants showed a slight tendency to form clusters of spikelets near the tips of the branches. In ordinary rice the spikelets consist of two small empty glumes which stand on the outside of the remaining flowering glume, and glume-like pale, which normally encloses two lodicules, six stamens, and a solitary pistil, with two styles and hairy stigmas. Whether these overlapping variations are due to some temporary disturbance in the plants, caused by an abnormal season, or they are the beginnings of progressive changes, has yet to be proved. It is probable that the production of the additional flowering glumes, pales, stamens, etc., but the double grain paddy might be a retrograde step. The author is looking for other stages in order to bring about an experimental evolution of the double grain paddy from the ordinary variety without the help of crossing.—*F. M. Schertz.*

2089. Blackwell, C. P., and R. E. Currin. **Work with field crops in South Carolina.** South Carolina Agric. Exp. Sta. Rept. 1918: 18–20, 38–39, 40, 41, 1918.—Progress report of variety tests and selection experiments. Found pollen from barren stalks gives progeny with a ratio of 1 barren to 2.56 normal stalks.—*H. K. Hayes.*

2090. Bos, J. Ritzema. [Rev. of: Marissen, J. Z. **Ten Rodengate. Algemeene Plantendeelt. (General plant breeding.)** 5 ed., revised by J. Elema. J. B. Wolters: Groningen, 1919.] Tijdschr. Plantenz. 25: 159–160. 1919.

2091. BOUQUET, A. G. B. **Pollination of tomatoes.** Oregon Agric. Exp. Sta. Bull. 157. *29 p., 5 fig.* 1919.—Author notes fact that when tomatoes are grown under glass unfavorable environmental conditions, such as absence of insects, relation of several reproductive organs in the development of the flower, and the correlation of the vegetative and reproductive systems of the plant, contribute to unfruitfulness which varies from 48 to 79 per cent. By hand-pollinations, in which the blossoms were emasculated, and pollen applied artificially, 72 per cent of fruitfulness was obtained. Hand-pollinations also increased the earliness of fruiting by 21 days. [See Bot. Absts. 3, Entry 2385.]—*C. E. Myers.*

2092. BRIDGES, CALVIN B. **Specific modifiers of eosin eye color in Drosophila melanogaster.** Jour. Exp. Zoöl. 28: 337–384. July 5, 1919.—Demonstration has been made of eight mutant genes which by themselves produce little or no effect upon eye color of flies homozygous for them, yet which modify eye color of sex-linked mutant "eosin." These "specific" and "disproportionate" modifications are clear and simple cases of "multiple genes." Each is the result of coaction of a specific modifying gene (cream a, cream II, dark, whiting, cream III, cream b, pinkish, cream c) and of a particular gene (eosin) which latter is necessary as a "base" or "differentiator." The scale of modifications of eosin produced by these several modifiers ranges on the one hand to a deep pink darker than "eosin," and on the other to a pure white. In origin these modifiers were entirely independent of one another, and the order of their occurrence bears only a random relationship to the dark-light seriation. The main significance of the facts presented is in their bearing on the question of method by which selection attains its results.—*Calvin B. Bridges.*

2093. BRIDGES, CALVIN B., AND OTTO L. MOHR. **The inheritance of the mutant character "vortex."** Genetics 4: 283–306. *1 fig.* May, 1919.—The character "vortex," affecting thorax of *Drosophila melanogaster*, depends primarily on two mutant genes—one in second chromosome (vortex II) and one in third chromosome (vortex III). Male flies must be homozygous for vortex II and for vortex III to show the character; but a small proportion of such males nevertheless fail to show it. Vortex females must also be homozygous for vortex II and generally for vortex III; but about 20 per cent of females homozygous for vortex II show the character when only heterozygous for vortex III. The proportion in which vortex III is dominant is increased by a third modifier (probably also in the second chromosome) which acts as a dominant sex-limited intensifier. The factor streak inhibits the appearance of the vortex character; but still another factor, located very near streak in the second chromosome, allows the appearance in streak flies of a vortex of a somewhat altered type.—*Alexander Weinstein.*

2094. BRIDGES, CALVIN B. **Maroon—are current mutation in Drosophila.** Proc. Nation. Acad. Sci. 4: 316–318. Oct., 1918.—The recessive eye-color mutation "maroon" has recurred independently at least four times, a phenomenon since found in several other loci. Located in third chromosome at locus 15.2. Maroon and "pink" are "non-modifiers" of each other, as most pink eye-colors have since been found to be. Third independent mutation to maroon occurred in chromosome already carrying new mutation "dwarf" and a gene with specific effect on crossing-over in third chromosome, probably identical with previous mutation "C_{III}". In "dichaete" region (including maroon) there is no great difference between homozygous and heterozygous C_{III} conditions. Detailed data will appear in Carnegie Institution Publication 278.—*C. R. Plunkett.*

2095. BROTHERTON, W. E. **Note on inheritance in Phaseolus.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 152. 1919.—*P. vulgaris* (dwarf variety) × *P. multiflorus* (tall variety) in F_1 showed 50 per cent decrease in length of hypocotyl, 100 per cent increase in length of epicotyl compared with *P. vulgaris;* cotyledons epigeal, plants dwarf. Tschermak found hypogeal cotyledons dominant. Cotyledons epigeal or hypogeal is not important. Genetic factors concern length of hypocotyl.—*W. E. Brotherton.*

2096. BURGER, OWEN F. **Sexuality in Cunninghamella.** Bot. Gaz. 68: 134–146. Aug., 1919.—Author has tabulated the sexual activity of 25 or 26 races of *Cunninghamella bertholletiae* as shown by the presence or absence of zygospore formation when 5 of these races were

used as testers. Author's summary follows: "1. In *Cunninghamella* there does not exist sexual dimorphism.—2. *C. echinulata* plus and minus, or *Mucor* V plus and minus as separated by Blakeslee, are unable to form progametes or gametes when contrasted with any one of 26 cultures of *C. bertholletiae*.—3. Many of these cultures of *C. bertholletiae* were able to form zygospores when contrasted with certain other cultures of this same species.—4. There exists a selective power in some strains to form zygospores with certain other strains. This condition of pseudo-heterothallism cannot be explained at present.—5. There exists a condition in some strains which might be called hermaphroditism.—6. In none of the hermaphrodite strains did branches of the hyphae conjugate.—7. Zygospores were produced only when 2 strains were contrasted whose gametes were compatible."—*A. F. Blakeslee.*

2097. Byrnes, Esther F. **Experiments in breeding as a means of determining some relationships among Cyclops.** Biol. Bull. 37: 40–49. *3 pl.* July, 1919.—Author seeks by examination of adults and of the different developmental instars to settle the question as to the validity of the two common forms "*Cyclops signatus* var. *coronatus* (*C. fuscus* Jurine) and *Cyclops signatus* var. *tenuicornis* (*C. albidus* Jurine)." Author finds certain adult characters distinct for the two forms and for the immature stages mentions the presence on the fourth swimming feet of a certain seta in a fully developed condition (together with a hairiness at the base of the segment having this seta) in the one form, and small or absent (together with a lack of the hairiness) in the other form. She finds these differences constant in generation after generation of her cultures.—*A. M. Banta.*

2098. Clute, Willard N. **Age and protoplasm.** Amer. Bot. 25: 107–108. 1919.—Commenting on the contention of Casper L. Redfield that the protoplasm of animals improves as it grows older, it is pointed out in support of this theory that, in the peony, pink daisy (*Pyrethrum hybridum*), and some melons, the characters of the flowers and seeds are influenced by the age of the plant. Doubling in peony and pink daisy is a matter of progression for several years.—*W. N. Clute.*

2099. Cobb, Frieda, and H. H. Bartlett. **A case of Mendelian segregation in Oenothera pratincola.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 151. 1919.—This is a preliminary abstract of: Cobb, Frieda, and H. H. Bartlett. **On Mendelian inheritance in crosses between mass-mutating and non-mass-mutating strains of Oenothera pratincola.** Jour. Washington Acad. Sci. 9: 462–483. Oct. 4, 1919. [See next following Entry, 2100.]—*H. H. Bartlett.*

2100. Cobb, Frieda, and H. H. Bartlett. **On Mendelian inheritance in crosses between mass-mutating and non-mass-mutating strains of Oenothera pratincola.** Jour. Washington Acad. Sci. 9: 462–483. Oct. 4, 1919.—In crosses between *Oe. pratincola* mut. *formosa* (true-breeding, revolute-leaved mutation from *Oe. pratincola* strain E) and f. *typica* strain E, inheritance is matroclinic. *Oe. pratincola* strain C pollinated by mut. *formosa* gives a matroclinic progeny. Mut. *formosa* pollinated by strain C gives, in the F_1, f. *typica*, in the F_2, Mendelian segregation of 3 f. *typica*: 1 mut. *formosa* (the latter breeding true, and, of the former, one third breeding true, two thirds repeating the splitting.)—Explanation offered: two types of gametes occur in *Oe. pratincola*, α (usually female) and β (usually male), the α carrying some character determiners not represented in the β. Mut. *formosa* arose from f. *typica* strain E by loss of the factor for flatness in the α portion of the α gamete. Therefore, change being in the α (female) gamete only, inheritance is matroclinic in crosses between mut. *formosa* and f. *typica* strain E. Strain C differs from strain E in having, in addition to the factor for flatness in the α portion of the α gamete, a Mendelian factor for flatness, present in both α and β gametes. Therefore strain C $\times$ mut. *formosa* gives a progeny of f. *typica* which breeds true (α gamete concerned was normal), while mut. *formosa* $\times$ strain C gives a progeny of f. *typica* which splits in the next generation (α gamete concerned had lost the factor for flatness, allowing the F_2 individuals which were recessive for the Mendelizing factors for flatness to show the revolute-leaved character. Restated,

strain C	$\alpha\beta FF$,	flat, and, with respect to this character, immutable.
strain E	$\alpha\beta ff$,	flat, mutable.
mut. *formosa*	$\alpha'\beta ff$,	revolute-leaved.
strain E × *formosa*	$\alpha\beta ff$,	flat, mutable.
formosa × strain E	$\alpha'\beta ff$,	revolute, breeding true with respect to this character.
strain C × *formosa*, F_1	$\alpha\beta Ff$,	flat, segregating with respect to mutability.
strain C × *formosa*, F_2	1 $\alpha\beta FF$,	flat, immutable, breeding true.
	2 $\alpha\beta Ff$,	flat, continuing the segregation of the F_1.
	1 $\alpha\beta ff$,	flat, mutable, otherwise breeding true.
formosa × strain C F_1	$\alpha'\beta Ff$,	flat, segregating with respect to revoluteness.
formosa × strain C F_2	1 $\alpha'\beta FF$,	flat, non-segregating.
	2 $\alpha'\beta Ff$	flat, continuing the segregation of the F_1.
	1 $\alpha'\beta ff$,	revolute, breeding true.

—*Frieda Cobb.*

2101. COCKERELL, T. D. A. **Hybrid sunflowers.** Nature [London] **102**: 25–26. 1918.—Results of hybridization in *Helianthus*: (1) varieties of *annuus* (including *lenticularis*) crossed together give fertile hybrids; (2) interspecific hybrids between annual species; viz., *annuus* crossed with *argophyllus*, *petiolaris*, and *cucumerifolius*, are nearly completely sterile; (3) interspecific hybrids between annual and perennial species resemble one parent. Hybrid previously reported between *pumilis* and *annuus* is hybrid of *subrhomboideus* and *annuus*. Brief discussion of interpretations of interspecific hybrid behavior.—*R. E. Clausen.*

2102. COLE, LEON J., AND FRANK J. KELLY. **Studies on inheritance in pigeons. III. Description and linkage relations of two sex-linked characters.** Genetics **4**: 183–203. Mar., 1919.—Two sex-linked characters of domestic pigeon have been studied, namely intensity of pigmentation (factor I), and an alteration in the appearance of black pigment (factor A). The A factor has variable effect on color of bird, differences depending, presumably, upon combinations of individual factors. There are apparently two main categories, dominant red and gray. The dominant red presents an interesting contrast with the recessive red described in previous publications. In the case of I, while the results were in accord with expectation as to the association of character with sex, there was a considerable disturbance of the sex ratio, the males being much in excess of expectation. This seems to be due largely to excess of males in particular families, and may be the result of a recessive sex-linked lethal factor. In the matings involving the A factor there was a deficiency rather than an excess of males. No explanation is apparent. The two sex-linked factors I and A show slight but appreciable mutual linkage. Crossing over in the male occurs in roughly 40 per cent of the cases; there is no crossing over in the female.—*Philip Hadley.*

2103. COLLINS, E. J. **Sex segregation in the Bryophyta.** Jour. Genetics **8**: 139–146. *Pl. 6, 5 fig.* June, 1919.—Author sowed 3 cultures of *Funaria hygrometrica* (monoecious): (1) from antheridia taken from single male "flower"; (2) from perigonial leaves of male flower; (3) from spores shed from one ripened capsule. Gametophytes from (3) were bisexual; those produced vegetatively from (1) and (2) showed antheridia only. Suggests possible origin of dioecism through somatic segregation in, and vegetative multiplication from, gametophyte tissue. Discusses related work of the Marchals, Douin, Allen.—*Merle C. Coulter.*

2104. COLLINS, J. L. **Chimeras in corn hybrids.** Jour. Heredity **10**: 2–10. *7 fig.* Jan., 1919.—An article dealing with the occurrence of chimeras in certain plants and their possible explanation. Grains of hybrid corn are reported in which xenia occurs only in a portion of the aleurone layer, others having sweet patches in the starchy endosperm. The theory of independent development of the second pollen tube nucleus and the endosperm nucleus is assumed by Correns and Webber. In the present case it cannot hold because the purple half of the seed should have had sweet endosperm, since the factor for purple aleurone and the factor for sweet endosperm were carried in the same nucleus. East and Hayes suggest Mendelian

segregation in somatic tissue which Babcock and Lloyd show to be impossible since separation of chromosomes occurs in heterotypic mitosis and does not normally occur during division of somatic cells. A more probable explanation is a factor mutation occurring in a single somatic cell such that all cells descending from the mutated cell would produce the chimera. The same theory applies to phenomena which occur in many plant genera. Among the F_2 grains of the cross, Extra Early Adams white dent corn with Black Mexican sweet corn a half purple and half white sweet grain was found. If the progeny from this grain gives evidence that the embryo is homozygous for the purple color, then the chimera can only have come about by somatic mutation. [See Bot. Absts. 2, Entry 930.]—*M. J. Dorsey.*

2105. Correns, C. **Die Absterbeordnung der beiden Geschlechter einer getrenntgeschlechtigen Doldenpflanze (Trinia glauca). [Order of death of the two sexes in a dioecious umbelwort (Trinia glauca).]** Biol. Zentralbl. 39: 105–122. *3 fig.* Mar., 1919.—Dioecious, biennial *Trinia glauca* shows one-to-one sex ratio just before bloom. Before this, mortality of males and females is equal. With beginning of bloom the death rate of males becomes nineteen times death rate of females. Since this ratio remains constant throughout period of bloom, death cannot be due to completion of life cycle but to differences in resistance to disease observed in both sexes.—*Helene Boas Yampolsky.*

2106. Cowgill, H. B. **Cross-pollination of sugar cane.** Jour. Amer. Soc. Agron. 10: 302–306 1918—This paper contains a brief historical review of methods used in breeding sugar cane. The difficulty of emasculating sugar cane flowers and securing crosses by hand-pollination is explained and several methods used by others to secure cross-pollination are mentioned. The method devised by the author for use in Porto Rico is described: cheese cloth bags, 18 inches in diameter and 48 inches long, and held extended by heavy wire rings are placed over the panicles. One ring is placed at the upper end of the bag and the other 16 inches from the lower end. This 16 inch apron may be drawn together around the stem below the panicle and tied so as to keep out undesirable pollen. The bags are supported by bamboo poles and placed in position when panicles first appear. Some varieties of cane are almost completely self-sterile. On account of this fact it is possible to cross them by placing the panicle of some other variety in the bag in position so that the pollen when shed will be carried to stigmas. Several different crosses and combinations have been made in this way and a thousand or more hybrid seedlings secured each year for three years. That these seedlings were true hybrids was evidenced by the fact that characters of both parents were found combined in them.—*H. B. Brown.*

2107. Cowgill, H. B. **Studies in inheritance in sugar cane.** Jour. Dept. Agric. Porto Rico 2: 33–41. 1918.—Seedling sugar canes show a certain degree or resemblance to their parents, particularly in regard to color. There is wider variation in seedlings than in plants from cuttings of the same variety. Certain varieties produce better seedlings than others, and some produce a larger percentage of abnormal seedlings. In crosses a recombination of characters of the parents appears to be produced in some seedlings. This is considered to be due to dominance of certain characters derived from each parent. Only slight difference in sugar content has been observed between groups of seedlings produced from different varieties.—*S. C. Harland.*

2108. Darbishire, F. V. **Sugar beet seed.** Jour. Soc. Chem. Ind., Rev., 38: 21. 1919. —Danger of depending on a foreign country for essential raw materials illustrated by fact that in United States the beet sugar industry needs annually about 6000 tons of seed, 4000 tons of which was formerly brought from Germany. Progress in seed production in this country since 1915 is noted, production in 1917 reaching 2773 tons. German grades of super-élite, élite and commercial seed are described. Reason for requirement of five years (in Europe and eastern America) is explained. Effort to develop sugar beets with single-germ seed-balls is mentioned; also importance of working for disease resistance.—*E. B. Babcock.*

2109. DAVIS, BRADLEY M. **The segregation of Oenothera brevistylis from crosses with Oenothera Lamarckiana.** Genetics 3: 501–533. *7 fig.* Nov., 1918.—Plants of F_1 generations of reciprocal crosses between *Oenothera Lamarckiana* and *Oenothera brevistylis* (true-breeding mutation from *Oe. Lamarckiana*) are *Lamarckiana.* F_2 generations show sharp segregation of *brevistylis* plants from *Lamarckiana,* approximately in Mendelian ratio 3 *Lamarckiana* : 1 *brevistylis.* Double reciprocal crosses give 3 : 1 ratio. Back crosses of reciprocal F_1 hybrids to *Lamarckiana* give *Lamarckiana;* to *brevistylis* give segregation approximating 1 : 1. Departures from expected ratios—too few *brevistylis*—are correlated with lower percentage of viable seed, showing selective mortality due to environment. Seed forced to complete germination in Petri dishes gives higher germination than that sown in soil, but as much irregularity in ratios. Twelve tables present data of experiments. Characters of *brevistylis* are inherited as a unit. Selection toward better development of pistil in *brevistylis* has been started.—*Frieda Cobb.*

2110. DE LA VAULX, R. **Observations sur l'apparition des daphnies gynandromorphes. [Observations upon the appearance of gynandromorphous daphnids.]** Bull. Soc. Zool. France **43**: 187–194. *2 fig.* 1918.—Continuing his description (*Ibid.* **40**: 194–197. 1916) of what he calls gynandromorphs of *Daphnia atkinsoni* the author refers to 24 additional such individuals (14 having been described in earlier papers). With one exception these abnormal individuals arose in the spring or early summer in successive years, 1915 to 1918, from poorly nourished stock. Part of these were from descendants of earlier sex intergrades. All parts of the body capable of sexual modification showed various intermediate sex conditions, but the antennules were more frequently modified. The different abnormal females (all possessed ovaries) had secondary sex characters of various degrees of maleness and femaleness. Frequently in a single individual certain characters were fully male, others slightly or moderately male and some fully female. Author cites the occurrence of two ephippial intergrades and the production of two normal female young from ephippial eggs of one of these as showing the independence of the secondary sexual characters and the gonads.—Author concludes that the eggs of *Cladocera* which without fertilization produce females, males, and all conceivable intermediate types, indicate that notwithstanding the favor enjoyed by the chromosome theories the problem of sex determination preserves all its complexity.—*A. M. Banta.*

2111. DE VRIES, HUGO. **Twin hybrids of Oenothera Hookeri T. & G.** Genetics 3: 397–421. Sept., 1918.—Investigations of crosses between *Oe. Hookeri* T. & G. and the mutating species of *Oenothera* throw light upon the rôle of lethal factors and hybrid mutants in splitting phenomena of normal mutations. *Oe. Hookeri* is an isogamic species. *Oe. grandiflora* splits into (1) type and (2) *Oe. grandiflora* mut. *ochracea,* a pale race. *Oe. grandiflora* × *Oe. Hookeri,* and reciprocal cross, produce *laeta* (59 per cent) and *velutina* (41 per cent). Mut. *ochracea* × *Oe. Hookeri* gives *laeta. Laeta,* then, is produced by fertilization of mutated gametes and *velutina* by non-mutated sexual cells. *Laeta* splits into *laeta* (60 per cent) and *velutina* (40 per cent) when self-fertilized. Reciprocal crosses, *laeta* × *velutina* and *laeta* × *Hookeri* show *laeta* to be isogamic. Selfed *velutina* gives constant progeny splitting only in character for size of flowers, small flowers (27 per cent) recessive.—In crosses with *Oe. grandiflora, Oe. franciscana* (Bartlett 1914) behaves as *Oe. Hookeri. Oe. Lamarckiana* behaves as *Oe. grandiflora* in crosses with *Oe. Hookeri,* a fact explained by assuming mass mutation into *Oe. Lamarckiana* mut. *velutina* (*Oe.* mut. *blandina*) for *Oe. Lamarckiana.* Absence of a lethal factor in all crosses is shown by the high percentage of *velutina* in the progeny and the very small percentage of empty seeds in *laeta. Oe. franciscana* behaves as *Oe. Hookeri* in crosses with *Oe. Lamarckiana.*—*Oe. biennis* Linn. × *Oe. Hookeri* gives constant progeny. *Oe. Hookeri* × *Oe. biennis* gives *rubiennis* which splits into (1) *rubiennis* and (2) *Hookeri* type in F_2. In F_3 et seq. *Hookeri* is constant, *rubiennis* continuing unilateral splitting. Heterogamy of *Oe. biennis* is tested by the crosses *Oe.* (*syrticola* × *biennis*) × *Oe. Hookeri* and *Oe.* (*biennis* × *syrticola*) × *Oe. Hookeri.* The offspring correspond, respectively, to those of *Oe. biennis* × *Oe. Hookeri* and *Oe. syrticola* × *Oe. Hookeri,* the characters of the pistillate parent of the original crosses being eliminated. No conclusion is drawn; explanation by means of lethal

factors is suggested. *Oe. franciscana* and *Oe. Lamarckiana* mut. *velutina* behave as *Oe. Hookeri* in crosses with *Oe. biennis*. *Oe. suaveolens* behaves as *Oe. biennis* in crosses with *Oe. Hookeri* with following exceptions—appearance in *rubiennis* F_1 of a narrow-leaved (constant) mutant and in F_2 of mutants (1) *lutescens*, (2) small-leaved, and (3) *aurea*, showy race with golden foliage.—*Oe. Cockerelli* in all crosses fails to produce the splitting hybrids characteristic of *Oe. Hookeri* crosses.—*Oe. Hookeri* T. & G., *Oe. franciscana* (Bartlett) and *Oe. Lamarckiana* mut. *velutina* (*Oe.* mut. *blandina*), three large-flowering species, produce splitting *laeta* and splitting *rubiennis*. These split into (1) splitting type and (2) type of other grandparent. *Laeta* and *rubiennis* are constant in no observed case. Apart from rare Mendelian segregation, other *Oenothera* hybrids are constant.—*Paul A. Warren.*

2112. de Vries, Hugo. **Oenothera Lamarckiana mut. simplex.** Ber. Deutsch. Bot. Ges. 37: 65–73. May 15, 1919.—In 1906 author observed a new mutant form in a pure bred family of *Oenothera Lamarckiana* mut. *oblonga* which in many respects paralleled his *Oe. Lamarckiana* mut. *velutina* (syn: *Oe. blandina*). Like the latter, it yielded very few sterile seeds (about 87 per cent with living germs) and produced twin forms when crossed. The new type, which he calls *Oe. Lamarckiana* mut. *simplex*, is regarded as an important one, since, unlike *Oe. velutina*, it has retained the mutability of *Oe. Lamarckiana*. In a culture of 2000 seedlings of the fourth generation derived from pure-bred seed, he recognized the following mutants: *semigigas nanella, lata, scintillans, linearis, deserens, metallica* and *secunda;* essentially the same mutants as produced by the mother species. Though *Oe. rubrinervis* and *Oe. oblonga* were absent, *Oe. deserens*, another brittle form, appeared in the place of the former, and *Oe. metallica* in the place of the latter. Author discusses the gametic origin of *Oe. Lamarckiana*, *Oe.* mut. *simplex* and several derivatives of each, concluding that the former arose through mutation and is not hybrid resulting from a cross between two earlier races; also that *Oe.* mut. *simplex* is a homozygous, mutating race.—*Anne M. Lutz*

2113. de Vries, Hugo. [Rev. of: Ernst, Alfred. **Bastardierung als Ursache der Apogamie im Pflanzenreich. (Hybridization as the cause of apogamy in the plant kingdom.)** 8vo, xv + *650 p., 2 pl., 172 fig.* Gustav Fischer: Jena, 1918.] Science 49: 381–382. April, 1919. —Some investigators assume that one of the chief causes of mutation is to be looked for in crossing, while others think that crosses are too rare in nature to have had any appreciable effect in the production of new species, except for the polymorphous genera. The best way to decide the question is to study the influence of hybridizing on the origin of a new character, viz., apogamy, by means of artificial crosses. The book gives a full description of all known cases of apogamy, including algae, fungi, *Marsilia*, *Antennaria*, *Alchemilla* and *Hieracium*. The doubling of chromosomes, the terminology of parthenogenesis, nucellar embryos, lessened fertility and many other effects of hybridizing and vegetative propagation are extensively dealt with. The author concludes that *Chara crinita* seems to afford the best material for further studies, and he gives a review of the mode of propagation of this alga. [See also Bot. Absts. 3, Entry 2151.]—*A.H. Chivers.*

2114. de Vries, H. **Halbmutanten und Massenmutationen. [Half-mutants and mass mutations.]** Ber. Deutsch. Bot. Ges. 36: 193–199. 1918.—No species or varieties have been proved to have been produced by fluctuating variations. Certain mutations are established (investigations of Baur, Cockerell, Babcock and Morgan cited). Mass mutation and half-mutants are assumed to be the starting point of these mutations. Mass mutation is the production of new types, not in 1 per cent or less, but in higher percentages of the progeny. Author assumes certain gametes to be mutated before fertilization (premutation). Thus an individual mutant is produced by the fusion of two mutated gametes, a half-mutant by the fusion of a mutated with a normal gamete. Half-mutants split in true Mendelian fashion. *Oenothera gigas* selfed gives constant dwarf types in 1–2 per cent of offspring. Remainder of progeny is (1) pure *gigas* type and (2) half-mutants which, when selfed, split into (1) pure *gigas*, (2) half-mutants and (3) pure dwarfs in a 1 : 2 : 1 ratio. Half-mutants are thus hybrid-mutants but from gametes of the same origin. Baden corn, which for six generations

showed no unbranched progeny, produced in the seventh generation 40 in 340 (12 per cent) unbranched individuals with undeveloped panicles (mass mutation). Progeny from these were unbranched in 19 per cent of cases. It is assumed that in the fifth generation a gamete mutated and mated with a normal gamete producing a half-mutant in the sixth which, by splitting, gave the pure mutants in the seventh generation. In the production of albino forms by mass mutation (percentages noted for four species) half-mutants (green forms) are also produced which segregate in Mendelian fashion.—In dioecious and self-sterile plants the relationships are more complicated. Seven species were investigated by the writer, especially the self-sterile *Linaria vulgaris* in which peloric forms appear sporadically in nature. In this case the fifth generation shows 1 per cent of completely peloric forms. Assume mutated gametes in the third, or earlier generation, half-mutants in the fourth and mutants in the fifth produced by half-mutant × half-mutant. Here again half-mutants are recognizable only by their progeny on account of the dominance of the original pure type. An analogous case is that of the production of doubles in *Chrysanthemum segetum*.—In MORGAN's investigations upon *Drosophila ampelophila* over 100 mutations have appeared but in small percentages. Assume premutation to produce half-mutants which when fertilized by half-mutants give rise to mutant types. Premutations or "inner" mutations, are often very complicated but the principle remains the same. The explanation of the original mutation of the gametes is not yet forthcoming.—*Paul A. Warren.*

2115. DUDGEON, G. C. **The maintenance of the quality of Egyptian cotton.** Bull. Imp. Inst. (South Kensington) 16: 160–170. 1918.—Varieties of cotton in Egypt are stated to have arisen from individual plants (possibly mutants) selected for superior qualities and are believed to have bred true until exposed to crossings with other varieties. Cross-pollination and mixing of seed at gins are considered responsible for rapid loss of uniformity, which makes continuation of industry dependent upon appearance, at frequent intervals, of new varieties. Author discusses practical measures for maintaining purity of varieties grown.—*T. H. Kearney.*

2116. DUERDEN, J. E. **Breeding experiments with North African and South African ostriches. IV. Increasing the number of plumes: degeneration and restoration.** Union of South Africa Dept. Agric. Bull. 7. *39 p., 12 fig.* 1918.—Wild ostriches of northern Africa and strains long under domestication in the south, agree in having from 33 to 39 remiges on each wing. The mean for each group falls between 36 and 37, but there is evidence of several distinct biotypes both in northern and southern stocks. These biotypes represent various stages of degeneration. Fortunately one surviving specimen with the original number of 42 primaries has been found and proved to transmit the tendency to high feather production. The author confidently predicts that it will now be possible to disseminate this trait and very materially increase the commercial value of the annual crop of plumes.—*C. H. Danforth.*

2117. DUERDEN, J. E. **Some results of ostrich investigations.** South African Jour. Sci. 15: 247–284. *4 pl., 4 fig.* Nov.–Dec., 1918.—An account of the characteristics, habit , and general biology of the ostrich, with observations on the genetic behavior of various traits, and a critique on the systematic status of *Struthio camelus* and *S. australis*. Descended from more fully endowed ancestors, the ostrich is a form in which some intrinsic influences at work in the germ plasm cause successive mutations that tend to be predominantly in one direction. These mutations by short steps are denuding the bird of its plumage and gradually eliminating its wings and toes. While in no sense adaptive, the degenerative changes have not been as yet particularly disadvantageous, but they can not proceed farther without becoming so, and if the present tendency remains unchecked the genus must in a (geologically) short time become incapable of further existence. It is pointed out that this genus offers exceptional material for the study of degeneration from the point of view of genetics. A physiological observation of interest is the fact that the red and blue skin color of the male is due to presence of testes while his black plumage is due to absence of ovaries.—*F. G. Danforth.*

2118. Duerden, J. E. **Crossing the North African and South African ostrich.** Jour. Genetics 8: 155–198. *Pl. 7, 2 fig.* June, 1919.—Hybrids between North and South African ostriches are intermediate between the two parents except that baldness of the northern form is completely dominant. The limited data indicate that in F_2 various original traits tend to segregate in true Mendelian fashion. Blending in F_1 is attributed to interaction in the hybrid germ plasm of homologous, but still not quite identical, genes. In this paper the author still further elaborates his view that in all ostriches, perhaps in the Ratitae as a whole, there is some inherent degenerative tendency that manifests itself through successive small mutations, affecting particularly feathers, wings and toes. Emphasis is laid upon the point that, while the usual evolutionary conception of mutation is one of fortuitous discontinuity, studies of the ostrich show that "discontinuous changes in the individual may proceed along definite lines and result in determinate continuous evolution for the race as a whole."—*C. H. Danforth.*

2119. Easlea, Walter. **Mildew resistant roses: with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. 43: 253–260. 1919.—Author notes that many of our present hybrid varieties owe their weakness to one or the other of the parents. Urges more care in selecting of resistant parents, also growing of seedlings from desirable varieties which are resistant. Gives list of varieties which are more or less mildew-resisting. [See Bot. Absts. 3, Entry 2256.]—*C. E. Myers.*

2120. East, E. M. **Studies on self-sterility. III. The relation between self-fertile and self-sterile plants.** Genetics 4: 341–345. July, 1919.—Summary of the self-sterility (of the type due to physiological incompatibility) and the self-fertility of hybrids between the so-called self-sterile species *Nicotiana Forgetiana* and *N. alata* with the self-fertile species *N. Langsdorffii.* The F_1 are reported to be all self-fertile. Of the F_2, of one cross 144 were self-fertile and 38 self-sterile; from the other cross 200 were self-fertile and 38 self-sterile. The F_3 grown from self-sterile plants of the F_2 are reported all self-sterile. The genetic difference between self-sterile and self-fertile plants in these species is ascribed to the presence and absence of a single determiner for self-fertility. The discrepancies in ratios are considered to be due to "pseudo self-fertility." Variations in the development of "pseudo self-fertility" are reported and these are assumed to be due to another factor or factors which dilute the action of sterility due to the absence of the factor for fertility.—*A. B. Stout.*

2121. East, E. M. **Studies on self-sterility. IV. Selective fertilization.** Genetics 4: 346–355. July, 1919.—Test for selective fertilization in hybrids between the two decidedly self-sterile species *Nicotiana Forgetiana* and *N. alata,* made by comparing variability in the rate of pollen-tube growth of compatible crosses among an F_2 with that of sib matings of the F_6. Data presented for five sections of pistils of each of the two sorts show no significant differences in the two cases.—*A. B. Stout.*

2122. East, E. M. **Studies on self-sterility. V. A family of self-sterile plants wholly cross-sterile inter se.** Genetics 4: 356–363. July, 1919.—Results of a further study of cross-incompatibilities in a family derived by crossing a plant of *Nicotiana alata* (♀) with an F_1 plant (♂) of *N. Forgetiana* × *N. alata.* Of a considerable number of crosses only 13 combinations produced capsules and seeds. The successful cases are ascribed to pseudo cross-fertility and the family is considered as fully self-sterile and cross-sterile. Due to origin of family and the behavior of a sister family the condition is difficult to explain on assumption of a homozygosity for factors of sterility.—*A. B. Stout.*

2123. Erdmann, R. **Endomixis and size variations in pure lines of Paramoecium aurelia.** Proc. Soc. Exp. Biol. Med. 16: 60–65. 1919.—Author refers to work of Jennings on selection in *Parameecium* and *Difflugia,* and discusses the relation of endomixis to the formation of heritably diverse lines in *Paramecium* during asexual reproduction. She decides that endomixis "acts as a *stabilizer* and effaces the fluctuations around the mean, that Jennings had seen in his cultures." The conclusion is reached that endomixis also gives rise to new combinations that can be selected and is thus an "*originator* of new lines." Directed selection can thus isolate heritably diverse lines in an asexually propagated organism.—*R. W. Hegner.*

2124. FISCHER, ED. [Rev. of: KLEBAHN, H. **Impfversuche mit Pfropfbastarden. (Infection experiments with graft hybrids.)** Flora 11-12: 418-430. 1918.] Zeitschr. Bot. 10: 765-766. 1918.

2125. FREEMAN, G. F. **A mechanical explanation of progressive changes in the proportion of hard and soft kernels in wheat.** Jour. Amer. Soc. Agron. 10: 23-28. Jan., 1918.—The tendency of high gluten wheats to become low gluten wheats, that is, the tendency of a corneous endosperm to become mealy, is attributed to progressive selection. A positive correlation was found between hardness or corneousness in Durum wheat and yield. A negative correlation was found between hardness or corneousness and yield with all other varieties tested at Yuma. In other words, under the hot southern climates hard Durum wheats are the high yielders. Consequently, the hard strains under climatic selection tend to increase. On the other hand, in other strains, the bread and Poulards, the hard strains, yield much less than the soft strains. This difference in a period of years results in a considerable climatic selection, sufficient in a ten-year period to convert a hard Turkey into a soft Turkey by the gradual increase brought about by the differences in yield by soft and hard strains within the type. The possibility of overcoming this tendency is suggested by means of isolating pure strains by individual plant selection and later propagation if there is apparently no change within the strain itself. The change is brought about by the more rapid propagation of one group of strains (soft) as compared with a less productive group of strains (hard).—*Alvin Kezer.*

2126. GERTZ, O. **Panachering hos Mercurialis perennis L. En morfologisk, anatomisk och mikrokemisk studie. (Mit Zusammenfassung und Figurerklärung in deutscher Sprache.) [Variegation in Mercurialis perennis L. A morphological, anatomical and microchemical study. (With summary and explanation of figures in German.)]** Bot. Notiser 1919: 153-164. *22 fig.* 1919.—The author describes a form with white-tinged leaves from Torup in Skåne (Sweden). The epidermal cells of the white parts of the leaves lack the undulation of the cellwalls and are always smaller than those of the green parts. Several anomalies of the stomata were observed. The green parts of the leaves were 2.1-1.5 times as thick as the white ones and have larger intercellular spaces. The blue color of the leaves that is often to be observed in dried specimens of *Mercurialis* is due to an oxidation process. Author promises further investigation, also from genetical point of view. [See Bot. Absts. 4, Entry 1557.]—*K. V. Ossian Dahlgren.*

2127. GONZÁLEZ RIOS, P. **La producción de nuevas variedades de cañas. [The production of new varieties of sugar cane.]** Rev. Agric. Puerto Rico 2: 29-38. *8 fig.* 1918.—Chief aim in producing new varieties is to combine characteristics and indispensable qualities of good cane considered in two aspects.—A. For cultivation: 1. Germinating power. 2. Resistance against excessive rains or drouth. 3. Growth habit, erect or sprawling. 4. Resistance against fungous or insect diseases. 5. Length of growing period. 6. Tonnage. 7. Power of rattooning.—*B.* For the factory: 1. Characteristics of the canes. 2. Quality and quantity of bagasse, whether brittle or flexible. 3. Juicy or dry. 4. Richness of juice. 5. Purity of juice.—Problem is to produce varieties by crossing which are adapted to various conditions obtaining in different localities. Botanical characters of inflorescence described. Flowers usually perfect but sometimes panicles contain only male or female flowers. Hybridization is done in various ways. 1. Planting varieties alternately, a row or one kind and a row of the other, or alternating the stools. Wind will transfer pollen and effect natural crossing. 2. Enclosing flower-stalks of both parents, while *in situ,* together in small cloth bag. 3. A bagged flower-stalk may be severed and placed in contact with flowers of another growing one. This method has the disadvantage that viability of pollen quickly deteriorates due to humidity or dryness. All these methods produce seedlings and the majority are hybrids. 19 of 30 crosses were successful, giving 1589 seedlings. Seeds are described as to size, shape and morphology. Sowing, transplanting and general culture of seedlings are detailed. Selections are made before maturity, based on number and size of canes, regularity of diameter, high per cent of sucrose, scarcity of fiber, resistance to fungous and insect diseases, etc.—*E. Eugene Barker.*

2128. Gourlay, W. Balfour, and G. M. Vevers. **Vaccinium intermedium Ruthe·** Jour. Botany 57: 259–260. 1919.—This natural hybrid between *V. mytrillus* and *V. vitis-idaea* was discovered in Britain by Robert Garner in Maer Woods, Staffordshire, and exhibited in 1872, when it was thought to be a luxuriant state of *V. vitis-idaea* rather than a hybrid. It was described by N. E. Brown in Jour. Linn. Soc. 24: 125, 1887, as *V. intermedium* Ruthe, from specimens collected by T. G. Bonney on Cannoch Chase. The plant is locally very abundant in the Cannoch Chase area. Slight variations in different localities indicate different acts of hybridization for each locality. Though the parent species must occur together in many localities in England, only one other place has been recorded for the hybrid. The writer asks if any circumstance at Cannoch Chase can be specially favorable for the production and spread of the hybrid, and finds the answer in the constantly disturbed condition of the soil over this area due to its having long been a military training ground. In unmolested areas the parent species grow intermingled, but no hybrids are produced. The flowering periods of the two parents are different, but overlap slightly. Some characters of the hybrid are given. It is said to fruit sparingly. The fertility of the seed is now being tested. —*K. M. Wiegand.*

2129. Gowen, John Whittemore. **A biometrical study of crossing over. On the mechanism of crossing over in the third chromosome of Drosophila melanogaster.** Genetics 4: 205–250. *2 diagram.* May, 1919.—Crossing over is a very variable phenomenon, the coefficient of variation ranging from 18 to 59 for single crossing over and from 67 to 110 for double crossing over. This is a greater variability than has been observed in other physiological or morphological characters. In the third chromosome, crossing over is not affected by external conditions (food, temperature, season, or bottle output); but it is affected by the genes present. Selection for high and for low crossing over was unsuccessful, indicating that there were no differences in modifying factors in the selection experiment. There is a positive correlation between variations in crossing over in different regions of the third chromosome. When allowance for this correlation is made, double crossing over is more likely to occur when the two breaking points are 25 to 35 units apart than when the intermediate distance is greater or less.—*Alexander Weinstein.*

2130. Green, E. Ernest. **As regards mutation in Coccidae.** Trans. Entomol. Soc. London 1918: 149–154. 1918.—The author holds that the resemblance of the scale insect, *Lecanium* (*Coccus*) *viride* to an allied species, *Pulvinaria psidii*, is superficial. He points out a number of differences in various organs and concludes adversely to the hypothesis of K. Kunhi Kannan that one has arisen from the other by mutation. [See Bot. Absts. 3, Entry 2149.]—*Sewall Wright.*

2131. Hadley, Philip. **Egg-weight as a criterion of numerical production in the domestic fowl.** Amer. Nat. 53: 377–393. *1 fig.* Sept.–Oct., 1919.—In a small flock of White Plymouth Rocks mean egg weight and mean flock production paralleled each other in the direction of their fluctuations. That portion of flock showing greatest increase in egg weight, had also the greatest mean annual production, while that showing the least had lowest mean annual production. Possibility of use of increase in egg weight as an index of annual production is suggested.—*H. D. Goodale.*

2132. Harland, S. C. **Notes on inheritance in the cowpea.** Agric. News [Barbados] 18: 68. 1919.—Brief summary of paper to be published in Journal of Genetics. Announces discovery of another color factor P involved in anthocyanin coloration of calyx, peduncle and tip of young pod. This gene, two previously discovered genes, B and E, together with their respective recessives, p, b, and e, behave as a series of multiple allelomorphs. [See also Bot. Absts. 3, Entry 1003.]—*R. J. Garber.*

2133. Harper, R. A. **The structure of protoplasm.** Amer. Jour. Bot. 6: 273–300. July, 1919.—No new theory is presented but the writer sees a movement away from the older idea of the cell as an assemblage of physical units of various sorts to the conception of the proto-

plasm as a unit, its structure identical with the structure of the cell. New contributions to the subject, from cytology, from experimental genetics and from the chemistry of colloids, are discussed with the conclusion that "the old attempts to solve the problem of protoplasmic behavior by the assumption that it is composed of physiological units, biophores, determiners, plasomes, pangens, etc., and the newer conception that its essential elements are unit factors, are being merged in the conception that the structure of protoplasm is the structure of the cell as an organized system and itself the unit in all the complex interactions by which the egg develops into the specialized and differentiated many-celled organisms." [See Bot. Absts. 3, Entry 1934.]—*Margaret C. Ferguson.*

2134. Harris, J. A., and F. G. Benedict. **A biometric study of human basal metabolism.** Proc. Nation. Acad. Sci. [U. S. A.] 4: 370–373. 1918.—Determinations were made on 333 normal human individuals, men, women, and infants, of the heat production in the post-absorptive state and in complete muscular repose. The relationship between heat production and pulse rate, stature, and body weight was studied; correlation was found to exist between heat production and each of the other measurements, but to be insignificant between pulse rate and stature or body weight. Equations are given showing the decrease in heat production with age. The metabolism of women was found to be lower than that of men even when corrected for age, weight, and stature; the difference between the sexes was not evident in infancy but was well marked throughout adult life. It was found that contrary to the belief that heat production is "proportional to body surface but not to body weight," it was found to be highly and about equally correlated with body weight and body surface. Regression equations involving stature, weight, and age are given for the prediction of the daily heat production.—*Slyvia L. Parker.*

2135. Harrison, J. B. **Seedling sugar canes.** Agric. News, [Barbados] **17**: 289–290. 1918. Also in Internat. Sugar Jour. **20**: 558–559. 1918.—Various problems arising out of the production of sugar cane seedlings are discussed. It is easy to raise new varieties of high promise as plant canes, but difficult to produce types which will do well under a long rat-tooning system. Seedling canes show a tendency towards senile degeneration. The best seedlings have been raised from parents possessing both vegetative vigor and high saccharine content. In the West Indies the raising of new varieties by cross fertilization does not seem very promising, owing to the extremely heterozygous nature of West Indian varieties. In countries where relatively homozygous kinds are available, the application of Mendelian methods in raising seedlings may be of value.—*S. C. Harland.*

2136. Hartog, Marcus. **Parthénogénèse artificielle et germination. [Artificial parthenogenesis and germination.]** Scientia **26**: 17–27. 1919.—Phenomenon to be explained is not development of egg, but its repose until stimulated. Inactivity is due (as in seeds prior to germination) to inability to use food reserves. When fusion with sperm starts development, initiation is due (1) to introduction of enzyme by sperm, (2) to production of enzyme by sperm after it enters, or (3) to production of enzyme by egg on stimulation by sperm. Enzyme for digestion of reserves in many cases can be produced without entrance of sperm. Development without participation of sperm should not be called "fecundation" or "fertilization," but "induced parthenogenesis," and the means of inducing it "activation." Studies in induced parthenogenesis have contributed no new facts to knowledge of nature of life.—*A. Franklin Shull.*

2137. Haviland, Maud D., and Frances Pitt. **The selection of Helix nemoralis by the song-thrush (Turdus musicus).** Ann. Mag. Nat. Hist. **3**: 525–531. June, 1919.—Authors criticize the conclusion of Trueman (Ann. Mag. Nat. Hist., Oct., 1916) that *T. musicus* selects light-banded shells of *H. memoralis*, on the grounds that (a) *H. aspersa* as well as *H. nemoralis* is eaten, (b) there may be differences in the snail population in localities from which the shells found broken at the "anvils" (at which the birds habitually break their shells) and those from which the control collections were made, and (c) that there is no conclusive evidence of selection when snails of different pattern are exposed in the open or offered to the bird in confinement.—*J. Arthur Harris.*

2138. Hayes, H. K., and E. C. Stakman. **Rust resistance in timothy.** Jour. Amer. Soc. Agron. 11: 67–70. 1919.—At Minnesota Exp. Sta. in 1917 authors collected data from one hundred and twenty-five plants on rust resistance of eight Minnesota selected strains and eleven Cornell University improved strains of timothy (*Phleum pratense*). In a rust epidemic induced by spraying the second growth with spores of *Puccinia graminis* Cornell strains showed a high percentage of resistant plants while Minnesota strains were very susceptible. Investigation was discontinued after 1917. Authors conclude that a rust resistant timothy may be easily produced, and think that breeding for disease resistance is often a local problem. They believe that closer coöperation between investigators attacking the same problem would be of national significance.—*J. Ben Hill.*

2139. Hegner, R. W. **Heredity, variation, and the appearance of diversities during the vegetative reproduction of Arcella dentata.** Genetics 4: 95–150. *27 fig.* Mar., 1919.—*Arcella dentata* has many obvious advantages for genetic study, for example, spine number and shell diameter are not modified by growth and environmental factors after division is completed. It was found that the hereditary constitution of different families obtained by vegetative reproduction from different "wild" specimens differs with respect to spine number, probably a vast number of such heritably diverse families occurring in "wild" populations. By selection in 22 generations during 64 days two lines were obtained from a single specimen reproducing vegetatively, showing an increasing difference between their mean spine numbers as selection progressed. This divergence persisted through 35 days (18 generations) of non-selection and is regarded as permanent. Further, halves of the low line were subjected to 23 days (15 generations) selection, followed by 11 days non-selection, with similar result. These divergent subfamilies correspond in heritable characteristics to small families derived from many "wild" individuals. Parallel results were obtained for mean shell diameter of above-mentioned high and low lines and high and low branches of low line. There is significant correlation between spine number and shell diameter. In one instance a sudden large variation ("mutation") in spine number and shell diameter appeared in low line. It was markedly smaller and had fewer spines than other specimens of low line and "bred true." From this branch 3 distinct branches having larger specimens with more spines than any other branch of the selection family appeared. Empty shells were often produced by apparently normal specimens but had no influence upon heritable diversities studied.—A large family of *Arcella dentata*, derived from a single specimen by vegetative reproduction, was split by selection into heritably diverse branches as regards diameter and spine number. These resemble hereditarily diverse families obtained by vegetative reproduction from "wild" specimens. The formation of such hereditarily diverse branches appears to be a true case of evolution that has been observed in the laboratory and that occurs in a similar way in nature. —*A. R. Middleton.*

2140. Henry, Augustine, and Margaret G. Flood. **The history of the Dunkeld hybrid larch, Larix eurolepis, A. Henry, with notes on other hybrid conifers.** Proc. Roy. Irish Acad. 35: 55–66. *Pl. 11.* 1919.—A full description of the anatomical characters of the hybrid and the two parent species, *Larix leptolepis* and *L. europaea*, is given. The remarkable difference in the epidermal cells of the leaves of the European and Japanese larches—the surface of the former smooth, of the latter roughened with papillae—is connected with the fact that the Japanese tree bears considerably more shade than the European species. The papillose epidermis allows much light to penetrate the epidermis, and be available for photosynthesis. In the non-papillose epidermis most of the light is reflected, and is lost to the leaf as far as photosynthesis is concerned. In the hybrid only the cells on the central part of each surface of the leaf bear papillae; the rest of the epidermal cells are smooth. *L. eurolepis* grows with astonishing vigor, much surpassing either of the parents. A hybrid hemlock spruce, *Tsuga Jeffreyi* A. Henry, native of Mount Baker in British Columbia, and of the mountains behind Cowichan Lake, Vancouver Island, is also described.—*Aug. Henry.*

2141. Hooper, C. H. **The pollination of fruit in relation to commercial fruit growing.** British Bee Jour. 46 (1463): 13, 14. *Ibid.* 46 (1465): 28, 29. *Ibid.* 46 (1467): 45. *Ibid.* 46 (1470): 73. *Ibid.* 46 (1471): 79, 80. *Ibid.* 46 (1473): 97, 98. 1918.—This is mainly a summary of English work, including the experiments of the author. Most clones of apple produce more fruit if pollinated from another clone. Only 24 among several hundred are regarded as more or less self-fertile. The majority of pear clones are self-fertile. Six in England and 6 in America are noted as being slightly self-fertile. Some of the selfed fruits were seedless and cucumber-shaped. Plum clones are about equally divided between the self-sterile and the partially or wholly self-fertile. Only two are named which set fruit nearly as well when selfed as when cross-pollinated. The damsons are more or less self-fertile. Most of the cherry clones are self-fertile. Morello and Late Duke are self-fertile. Cherry clones are more inter-sterile than other fruits. Clones of gooseberry; white, red, and black currants; loganberry; and perfect-flowered strawberry; do not show self-sterility.—*John Belling.*

2142. Johnson, James. **The inheritance of branching habit in tobacco.** Genetics 4: 307–340. *8 pl., 2 fig.* July, 1919.—Inheritance of suckering habit has been studied in cross between Little Dutch, which produces few suckers, and Cuban, which produces many large suckers. Parents and several generations of cross were grown same year. Reciprocal crosses were alike in F_1, being intermediate in sucker number but slightly higher in weight of suckers. Range of the F_2 is as great as combined range of parents. Segregation is definitely shown in F_3 and later generations. Strains were isolated which were suckerless like Little Dutch parent and others which approach suckering habit of Cuban parent. Certain of these were no more variable than the parental types as shown by standard deviation (5). Segregation occurred for other characters, such as height of plant, number of nodes and leaves, size and shape of leaves. Two abnormalities were obtained. No correlation appears to exist between number, size and shape of leaves and suckering habit. Results are interpreted on the multiple factor hypothesis which has been formerly used for interpreting inheritance of quantitative characters.—*H. K. Hayes.*

2143. Jones, D. F. **Selection of pseudo-starchy endosperm in maize.** Genetics 4: 364–393. *8 pl., 1 diagram.* July, 1919.—Analysis of an apparently intermediate endosperm character in maize is presented. This intermediate condition between true starchy and sugary endosperm is termed pseudo-starchy, resembling the typical starchy maize in gross chemical analysis but approaching the sweet type in nature of the starch grains and texture of endosperm.—Selection experiments upon this endosperm character for 10 years were successful in producing as end results a typical starchy-appearing strain and a true sweet strain. Selection was not markedly effective in the first generation but during the following four generations the divergence between the two end types was completed.—Reciprocal crosses of this selected starchy (pseudo-starchy) strain and true starchy plants gave a starchy F_1 and a definite F_2 segregation of 3 starchy to 1 sweet. The appearance of the pseudo-starchy endosperm in F_2 as sweet endosperm indicates a genetic difference between pseudo- and true starchiness.—Reciprocal crosses between the end products of the selection experiments showed no immediate effect on the endosperm. This fact, coupled with the intermediate and variable nature of the F_1 ears as regards endosperm characters, and the occurrence in subsequent generations of a distinct 3 : 1 and 1 : 1 segregation of endosperm, suggest the presence of a plant factor governing endosperm expression and two endosperm factor-pairs.—The results of selection are explained as being due to the sorting-out and rearrangement of such factors and not to the progressive change of an intermediate and incompletely segregating genetic factor.—*E. W. Lindstrom.*

2144. Jones, D. F., and C. A. Gallastegui. **Some factor relations in maize with reference to linkage.** Amer. Nat. 53: 239–246. May–June, 1919.—Authors present data in confirmation of results of Collins that ordinary pod (tunicate) corn is heterozygous always throwing normal, heterozygous tunicate, and nearly sterile homozygous tunicate. They report discovery of linkage between factors for tunicate ear and sugary endosperm with 8.3 per cent

crossing-over, and independent inheritance of tunicate and yellow endosperm. Review published results of other investigators and suggest three independent groups of linked factors in maize.—*R. A. Emerson.*

2145. Kajanus, Birger. **Genetische Papaver-Notizen. [Genetical notes on Papaver.]** Bot. Notiser **1919**: 99–102. 1919.—Under the term "Rhoeas-group" the author includes with *Papaver somniferum* a number of commercial forms and the similar species *P. umbrosum, P. Hookeri,* and *P. laevigatum.* The species *P. pavonium* and *P. glaucum,* being distinct, are not included in this group. Members of the Rhoeas-group show considerable variation in a number of characters: flower and leaf color, color of stem hairs, and color of latex. Many of the types included in this group were almost or completely sterile when self-fertilized. One plant from the group produced selfed seed, the plants from which resembled their parent but they produced so few seeds that no conclusions were drawn regarding fertilization ratio.—Four types of artificial crosses are recorded: 1. Those between plants within the Rhoeas-group. 2. *P. rhoeas* ♀ × *P. glaucum* ♂. 3. *P. somniferum* ♀ × *P. rhoeas* ♂. 4. *P. somniferum* ♀ × *glaucum* ♂. Only crosses of the first two kinds produced positive results. Plants employed showed the following characters: white vs. yellow latex, light red vs. scarlet petals, white eye-spot (Herzflerken) vs. black eyespot. The F_1 plants showed segregation in latex color (24 yellow, 32 white) and in eye-spot color (black 24, white 31). A system of dominant and recessive genes is given in explanation of the alternative behavior of these characters. None of these F_1 plants produced fertile seed when self-fertilized. The cross *rhoeas* × *glaucum* produced 11 F_1 plants which showed typical F_1 hybrid vigor. They, however, showed some characters of both parents. Ten bagged flowers gave no selfed seed. Open-pollinated seed produced plants resembling *rhoeas.*—*J. L. Collins.*

2146. Kajanus, B. **Über eine konstant gelbbunte Pisum-Rasse. [On a constantly yellow-variegated variety of Pisum.]** Bot. Notiser **1918**: 83–84. 1918.—Author found in an F_3 family of *Pisum arvense punctatum* × *P. arvense maculatum* besides normal green plants also several yellow-variegated ones. The numerical relation of the two kinds of plants was probably 3:1. An exact count was not undertaken however. Three yellow-variegated plants gave (1) 55 yellow-variegated: 2 green; (2) 6:2; (3) 32:0. The occurrence of green plants is probably due to hybridization with normal individuals. One specimen of (3) produced only yellow-variegated plants and their offspring had the same coloration. The yellow-variegated variety is therefore constant.—*K. V. Ossian Dahlgren.*

2147. Kajanus, B. **Genetische Studien über die Blüten von Papaver somniferum L. [Genetical studies on the flowers of Papaver somniferum L.** Arkiv Bot. K. Svensk. Vetenskapsakad. 15^{18}: 1–87. *3 pl.* 1919 —Author has worked with about 20,000 plants. Doubleness depends on absence of two homomeric genes. For the splitting of the sepals it seems that at least three genes were operating. In the presence of these factors, entire petals can be obtained through influence of an inhibiting factor. There are specific genes for color and others which regulate the distribution of color. The color genes are divided into two groups, one for violet, one for red. In each group there is one fundamental gene that produces the weakest tint and a series of intensifying genes. Presence of the gene characteristic of the violet groups, alone, makes the petals violet above as well as below. The presence of the gene of the red group makes them red above and white below. If both genes are combined, the colors become red on the upper and violet on the under side, whereas in the absence of both genes the petals are white. The genes of distribution play a great rôle in the habit of the flowers and affect also the shade of color.—One gene is associated with green-striping, another with white-striping of the petals. Also in relation to other anomalies special genes are traced.—*K. V. Ossian Dahlgren.*

2148. Kajanus, B., and S. O. Berg. **Pisum-Kreuzungen. [Pisum-crosses.]** Arkiv Bot. K. Svensk. Vetenskapsakad. 15^{19}– 1–18. 1919.—A new inhibiting gene *O* is found, which suppresses dark blood-red or red brown color of the seed-coats. The effects of five other genes earlier treated by Lock (Ann. Roy. Bot. Gard. Peradenya **4**. 1908) have also been studied.—*K. V. Ossian Dahlgren.*

2149. Kannan, K. Kunhi. **Mutation in Coccidae.** Trans. Entomol. Soc. London 1918: 130–148. *4 pl.* 1918.—Typical specimens of the scale insect, *Coccus viridis*, originally described from Ceylon, appeared in Mysore in Southern India, in 1912. These had normal seven-jointed antennae. All specimens collected in later years were found to have a reduced number of joints, usually three. The author considers that a mutation had taken place. The variations of *Coccus viridis* in different parts of the world, and of an allied species, *Pulvinaria psidii*, are discussed. From a consideration of these variations, the author considers it probable that *C. viridis* has arisen from *P. psidii*, directly or indirectly, by mutation. [See Bot. Absts. 3, Entry 2130.]—*Sewall Wright.*

2150. Karper, R. E., and A. B. Conner. **Natural cross-pollination in milo.** Jour. Amer. Soc. Agron. 2: 257–259. 1919.—41 heads of white milo [*Sorghum*] which had been mechanically introduced into a plat of yellow milo were selected and planted the following year. Of 13,430 progeny, 788 were hybrid plants with yellow seed heads, 42 were hybrid plants not classed as yellow, while the percentage of cross fertilization was 6.18.—*F. M. Schertz.*

2151. Karsten, G. [Rev. of: Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. (Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.)** *8 vo., xv + 655 p., 2 pl., 172 fig.* Gustav Fischer: Jena, 1918.] Zeitschr. Bot. **11**: 53–61. 1919.—See also Bot. Absts. 3, Entry 2113.

2152. Kempton, J. H. **Inheritance of apotted aleurone color in hybrids of Chinese maize.** Genetics 4: 261–274. *3 fig., 3 diagrams.* May, 1919.—Spotted aleurone-color pattern is due to factor S but observed only when female parent of cross is heterozygous for aleurone-color factor R or is $r\ r$. Selfed ears of composition $R\ r\ S\ s$ had 29.4 per cent of colored seeds spotted. Observed percentage of spotting is assumed to be due to linkage of R and S with 12.5 per cent crossing-over.—*R. A. Emerson.*

2153. Kempton, J. H. **Inheritance of waxy endosperm in maize.** U. S. Dept. Agric. Bull. 754. *99 p., 14 fig.* June 26, 1919.—Counts of 198 ears with over 100,000 seeds of crosses of waxy with corneous endosperm showed a statistically significant deficiency of waxy segregates from the expected 25 per cent. Reciprocal crosses of heterozygous plants with homozygous waxy indicated, in some cases, a deficiency of effective male gametes bearing waxy. Author suggests unequal segregation or differential vigor or death rate. With respect to aleurone color, author reports a slight but statistically significant excess of white seeds over expected 25 per cent from selfed ears and a similar deficiency of white from ears back-crossed to recessive. Waxy endosperm was found not linked with aleurone-color factor R but linked with C, the percentage of crossing-over usually approximating 25 but in some cases approaching 20.—*R. A. Emerson.*

2154. Kihara, Hitoshi. **Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftverhältnisse unter Avena-arten. [Cytological studies in the cereals. II. Chromosome counts in reference to the relationship of oat species.]** Bot. Mag. Tokyo **33**: 94–97. *2 fig.* 1919.—See Bot. Absts. 3, Entry 1939.

2155. Klebahn [H.] [Rev. of: Bartlett, Harley Harris. **Mass mutation in Oenothera pratincola.** Bot. Gaz. 60: 425–456. 1915.] Zeitschr. indukt. Abstamm. Vererb. **21**: 134–136. July, 1919.

2156. Kottur, G. L. **Note on protecting the cotton flowers from natural crossing.** Poona Agric. Coll. Mag. 9: 131–132. *3 fig.* 1918.—Points out necessity of preventing natural cross-pollination of cotton flowers from which pure seed is desired and describes method of wiring fully developed but closed flower bud so as to prevent opening of corolla. [Similar method described by Rowland M. Meade in U. S. Dept. Agric. Bur. Plant Ind. Circ. 121: 29–30. 1913.]—*T. H. Kearney.*

2157. Lehmann, E. [Rev. of: (1) Bateson, W., and C. Pellew. **On the genetics of rogues among culinary peas (Pisum sativum).** Jour. Genetics **5**: 13–36. 1915. (2) Biffen. **The suppression of characters on crossing.** Jour. Genetics **5**: 225–228. 1915. (3) Backhouse, W. O. **The inheritance of glume length in Triticum polonicum. A case of zygotic inhibition.** Jour. Genetics **7**: 125–133. 1918. [See Bot. Absts. 1, Entry 211.] (4) Caporn, A. St. Clair. **The inheritance of tight and loose paleae in Avena nuda crosses.** Jour. Genetics **7**: 229. 1918. [See Bot. Absts. 1, Entry 866.] (5) Idem. **An account of an experiment to determine the heredity of early and late ripening in an oat cross.** Jour. Genetics **7**: 247. 1918. [See Bot. Absts. 1, Entry 867.] (6) Idem. **On a case of permanent variation in the glume lengths of extracted parental types and the inheritance of purple colour in the cross Triticum polonicum and T. Eloboni.** Jour. Genetics **7**: 259. 1918. [See Bot. Absts. 1, Entry 868.] Zeitschr. Bot. **10**: 758–763. 1918.

2158. Lehmann, E. [Rev. of: Heribert-Nilsson, Nils. **Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung Salix. (Experimental studies on variability, segregation, speciation and evolution in the genus Salix).** Lunds Univ. Arsskrift **14**: 1–145. *65 fig.* 1918.] Zeitschr. Bot. **11**: 205–212. 1919.

2159. Lehmann, Ernst. **Über die Selbststerilität von Veronica syriaca. [On the self-sterility of Veronica syriaca.]** Zeitschr. indukt. Abstamm. Vererb. **21**: 1–47. *1 fig.* May, 1919.—In a year of investigation with *Veronica syriaca*, not a single self-fertile plant was found. Subsequently, in a cross between two self-sterile individuals, 114 F_1 plants were studied. All proved to be self-sterile. These plants fell into four groups of about equal size which were intra-class sterile and inter-class fertile. Samples from each class were planted in isolated plats, but produced no seed. The author promises a Mendelian interpretation.—*E. M. East.*

2160. Lehmann, E. [Rev. of: White, O. E. **Inheritance studies in Pisum. I. Inheritance of cotyledon color.** Amer. Nat. **50**: 530. 1916.] Zeitschr. Bot. **10**: 763–764. 1918.

2161. Leighty, C. E., and T. B. Hutcheson. **On the blooming and fertilization of wheat flowers.** Jour. Amer. Soc. Agron. **11**: 143–162. *2 fig.* 1919.—Authors, working with Minnesota- and Virginia-grown varieties of wheat, observe that in 2977 cases the time of blooming is approximately evenly divided between night and day. In day time, morning-blooming is slightly more frequent than afternoon-blooming. Although undetermined, it is suspected that night-blooming actually occurs in early morning hours. Two active periods of day-blooming with peaks of curves at 8 a.m. and 4 p.m., suggest temperature relations as possible cause of such distribution. The observations correct the impression that wheat blooms only in early morning. The duration of period of blooming covers from 2 to 7 days, Minnesota-grown wheat produced kernels in 40.97 per cent of 1240 flowers emasculated but not covered. Virginia-grown wheat produced kernels in 83.3 per cent of 1324 flowers so treated. Resulting from errors of manipulation, 8 kernels, 0.78 per cent, were produced from 1030 flowers emasculated and covered. For accuracy in cross-pollinations in wheat, protection of the flowers is indicated. [See Bot. Absts. 3, Entry 1968.]—*J. Ben Hill.*

2162. Lenz, Fritz. **Alternative Modifikationen bei Schmetterlingen. [Alternative modifications in butterflies.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 304–309. Aug., 1918.—Referring to earlier work in which it was shown that pupae of butterfly *Papilio machaon* L. were either green or gray (with some intermediate forms), and that while many green pupae hung from stalks, most gray ones were attached to surfaces, author now reports that color is largely due to intensity of light prevailing just before pupation. Full light results in green, darkness in gray. Choice of place of pupation is also related in some way to light. Color determination is regarded as adaptation to conditions in nature.—*A. Franklin Shull.*

2163. Love, H. H., and W. T. Craig. **Methods used and results obtained in cereal investigations at the Cornell Station.** Jour. Amer. Soc. Agron. 10: 145–157. *1 pl., 1 fig.* April, 1918.—The row method of testing cereal crops in agronomic experiments as carried out at Cornell University has been adopted because replicated row plats enable greatly increased numbers to be handled on the same land with as great accuracy as larger plats and at much less cost. The probable error is very greatly reduced as the number of replications increases. It has been found that the chance of finding a superior strain in selection work is dependent upon the number handled. In a large number of cases of different selections the chance of finding a superior strain is a function of the numbers involved. Two general methods of selection are used. Head selections are made in the field, taking care to select from average growing conditions. These head selections are planted in head rows. The head rows average 2½ feet in length for wheat and 5 feet in length for oats. The length of row is dependent upon the number of kernels in the head selected. The second method of selection consists in planting selected strain with spacings of one foot each way. The superior plants from these one foot rectangular plantings are taken over for plant row tests the following year. Head row tests become plant row tests the second year. A large amount of elimination takes place in the head rows. In the plant row tests at least three-fourths of the strains disappear the first year, the superior strains being mostly in the one-fourth retained. The plant row tests are usually continued for three years, eliminating inferior strains each year. Special methods of planting have been devised. The harvested bundles at harvest are stored in a curing shed in the order of their field numbers. The length of the rod rows or plant rows varies in such a way that a simple factor can be used to convert the grams per row into bushels per acre. The oat rows are 15 feet. The grams are multiplied by 0.2 to obtain bushels per acre. For wheat, the length is 16 feet and for barley 20 feet, the conversion factor in each case being 0.1. For improvement work very few notes are taken. The note work is reduced to those strains which are actually shown to be superior and are thus kept. Rod rows do not give the same yields even when replicated, as are obtained by plants, but the yields are of the same order.—In hybrid work with grains, the strains to be crossed are planted in pots and grown in the greenhouse. This enables hybridization work to be done at a season when outside work is not heavily pressing, reducing the danger of contamination and injury by weather and enables the strains to be crossed to be brought closely together, saving time in carrying pollen from the pollen parent to the pistil parent. Later generations of hybrids are handled much as strain selection, except that segregations are made largely in the laboratory. One variation from standard methods of operation in pollinating is that the tips of the glumes may be clipped to facilitate the operation of pollination. When handled in the greenhouse, data show that there is practically no difference whether the glumes are clipped or unclipped. Brief mention is given of results obtained in crosses, but the detailed results are published elsewhere.—*Alvin Kezer.*

2164. Mackie, D. B. **Navel Satsumas found in California.** California Citrograph 4: 60. *1 fig.* Jan., 1919.—Writer recently reported in same journal the occurrence of navel fruits of Satsuma mandarin in Japan. A reader of that article reports finding at Oroville, California, navel fruits on certain branches of Satsuma trees. These fruits were seedless, and writer suggests possibility of propagating a seedless navel strain of Satsuma. [Ordinary Satsuma fruits are very largely seedless.] [See Bot. Absts. 3, Entry 2344.]—*H. B. Frost.*

2165. Martin, John Nathan. **Botany for agricultural students.** *16 × 24 cm., x + 585 p., 488 fig.* John Wiley & Sons, Inc.: New York, 1919.—Chapter 22 (p. 513–534), "Evolution," includes paragraphs on variation, heredity, experimental evolution, continuous variation, discontinuous variation or mutations, mutation in the evening primrose, the mutation theory and Darwinism, causes of variation, somatoplasm and germplasm. Chapter 23 (p. 535–556), "Heredity," is mostly devoted to a statement of Mendel's discoveries and their confirmation, but also gives single paragraphs to the physical basis of heredity, active and latent genes, and biometry. Chapter 24 (p. 557–565), "Plant breeding," contains brief sections on selection, mass culture, pedigree culture, selection of mutants, hybridization, crossing and vigor of offspring.—*Geo. H. Shull.*

2166. Matouschek. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid.—Die Enzymtheorie der Erblichkeit.—(The enzyme theory of heredity.)** Versl K. Akad. Wetensch. Amsterdam. **25**: 1231. 1917. (2) Idem. **The enzyme theorie of heredity.** Proc. K. Akad. van Wetensch. Amsterdam. **19**: 1275. 1917.] Zeitschr. Pflanzenkrankh. **29**: 78–79. 1919.—See also next following Entry, 2167.

2167. Matouschek. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid. (The enzyme theory of heredity.)** Versl. K. Akad. Wetensch. Amsterdam. **25**: 1231. 1917. (2) Idem. **The enzyme theorie of heredity.** Proc. Akad. Wetensch. Amsterdam **19**: 1275. 1917.] Zentralbl. Physiol. **33**: 307–308. Jan. 31, 1919.—See also next preceding Entry, 2166.

2168. McCampbell, C. W. **Kansas State Livestock Registry Board.** Kansas Agric. Exp. Sta. Insp. Circ. 8. *149 p.* 1918.—Contains several reports on the horse breeding industry of the country, and in addition a complete record of the registered stallions in the state of Kansas. Out of 5087 stallions registered, 3269 were pure-bred.—*Heman L. Ibsen.*

2169. Melin, D. **Några tankar om mimiery och skyddande likhet med stöd af dipterologiska studier. [Some thoughts on mimicry and cryptic colors based on dipterological studies.]** Entomol. Tidskr. **1918**: 239–294. *2 pl.* 1918.—In the first part the author deals with different problems of mimicry,—starting from the color scheme of Poulton. In the second section he presents his own experiences and speculations. He considers that natural selection does not cause so detailed correspondence of the morphology as the theory of mimicry demands. It is generally considered that birds are chiefly effective in natural selection of insects, supposition being that birds avoid "immune" species and are able to discover the slightest differences in the morphology of insects. Neither the first nor the second supposition agrees with observed facts. Against aggressive mimicry by robber flies (asilids), as the author has demonstrated, is the circumstance that these flies are able to distinguish details of form and color with much greater difficulty than animals of higher classes.—Flies very often hunt flying seed-downs by mistake.—The author considers that "warning colors" do not exist. The *Laphria* species thus attack ladybirds and other poisonous beetles; the Ichneumonides never spare similar larvae of butterflies, etc. The author's views are summarized as follows:—1. Mimicry and mimetic analogies depend upon the manner of living and upon external and internal influences.—2. Instinct acts in some degree as an influencing power.—3. Animals which are similar to immune species with bright colors or which agree in color with their surroundings, often will, by this reason, escape enemies. This advantage is however only secondary and without great importance.—4. Natural selection is therefore not directly produced by living enemies but only by different natural powers. Animals which in form and color react in the best way against the same, become determinative for the species.—*K. V. Ossian Dahlgren.*

2170. Mendiola, N. B. **An inhibitor in rice.** Philippine Agric. **7**: 65. 1918.—The author states that, in 1914, Jacobson reported two pink kernels, which he designated as (a) and (b) from a head of a white variety of rice. Upon inbreeding, (a) produced in the first generation 100 per cent white kernels, while in the second, 6 per cent red kernels and presumably (although it is not stated) 94 per cent white were obtained, while (b) gave in the first generation 100 per cent red and in the second, 24 per cent white and 76 per cent red. (b) Behaved as a simple monohybrid with red dominant over white, but (a) did not. Jacobson did not try to explain the behavior of (a). The author offers two explanations: 1st, that (a) was a monohybrid like (b) but that it failed to exhibit Mendelian ratio on account of the effect of environment. 2nd, there was possibly present in the original kernel an inhibitory determiner. That the character red was not absent in the first generation altogether is shown by the fact that it appeared in the second. The partial dominance of red in the second generation may have been due to the presence of an inhibitory determiner which prevented red from manifesting its total potency.—*H. B. Brown.*

2171. MEVES, FRIEDRICH. **Die Plastosomentheorie der Vererbung. Eine Antwort auf verschiedene Einwände. [The plastosome theory of inheritance. An answer to various objections.]** Arch. mikrosk. Anat. 92[II]: 41–136. *18 fig.* 1918.—The hypothesis defended here is that certain extra-nuclear granules are introduced into the plant egg-cell or animal ovum with the sperm of the pollen-tube; or with the middle-piece, or cytoplasm, of the spermatozoon. These granules (mitochondria or plastosomes) sometimes take the form of fine filaments. In the plant, they go to form the chloroplasts, or leukoplasts; or fragment in the formation of vessels, and form the internal ridges. A first-generation hybrid between a red-flowered and a white-flowered plant may be of intermediate color, because both anthocyanin and chromoplasts are products of the plastosomes; and plastosomes from the pollen of one parent have been mingled in the zygote with the plastosomes of the egg-cell of the other parent. The pigment granules of animals are also products of the plastosomes. Embryonic tissues, and certain cells of the adult plant or animal, are capable of division and development into new organs, if and because they contain unmodified plastosomes. Author regards the plastosome hypothesis, not as replacing the current nuclear theory of heredity; but as supplementary to it.—In *Ascaris* he has shown that plastosomes from the sperm-cell spread out in the egg-cytoplasm after fertilization. This has been confirmed. The granules were at first about 0.5 μ across. BOVERI and HOGUE centrifugalized such zygotes; and though the plastosomes collected into a clump, yet normal embryos resulted. In *Filaria,* the granules are larger, and change at later stages of cleavage into filaments. *Phallusia* and *Mytilus* have fewer mitochondria in the sperm, as compared with the egg. In fishes, amphibia, reptiles, and birds, there is an enormous difference in this respect. Author thinks that there is some proof of polyspermy being sufficiently widespread to compensate at least partly for the deficiency of plastosomes in the spermatozoon in these cases.—In *Echinus* the plastosome-bearing middle-piece of the spermatozoon goes into only one of the two first blastomeres. Author considers that this blastomere gives rise to the echinus, while the other blastomere forms that part of the pluteus which is destined to be thrown off. In *Vesperugo* and *Cavia* it has been shown that the tail of the spermatozoon at the first cleavage remains in one of the blastomeres. LEVI found, in another bat, the middle-piece of the spermatozoon in one of the two small segmentation cells. Author combines these facts with the opinion of Sobotta, that the mammalian egg has unequal blastomeres, only one of the first four forming the embryo, while the other three serve as trophoblasts.—The paper includes general arguments in favor of the theory; detailed replies to its many critics; a full history of the subject down to 1910; and a large bibliography.—*John Belling.*

2172. MEYER, ADOLF. **The right to marry; what can a democratic civilization do about heredity and child welfare?** Mental Hygiene 3: 48–58. Jan., 1919.—Author makes an effort to separate the relative influences of heredity and environment. He says: "What we speak of as heredity in the sense of influence of the parent on the constitution of the child, is oftenest the sum of three factors: (1) genuine heredity, that which comes with the germ cells and is itself inherited,—a property of the chromosomes; (2) early growth and nutrition; (3) early training and habit-formation." In answer to the self-put question, "Who is entitled to progeny?", he says: "We can do justice to the individual as well as to the race by making some practical conditions for such individuals to marry and have children; that is, if they can feel and give to their own sense and conscience (and I might add under the effects of three weeks' open consideration of marriage) reasonable assurance of giving a family of four children a wholesome, healthy environment and education, then even tainted persons might be allowed to marry, especially into untainted stock. If any unfavorable heredity should crop out, it would be highly probable that healthy and capable brothers and sisters would be able to assure the protection and care of the problematic abnormal individual. This excludes the marriage of imbeciles and of many psychopaths.—"In this present stage of development, eugenics has no right to attempt to enforce a stronger negative policy than this. If it does so, it runs the risk of depriving the race of individuals who would be a benefit to it. I certainly should not like to miss some of the brothers and sisters of certain of my patients from this globe, nor even a good many of the actual patients themselves."—The paper gives sum-

maries of a few family history studies. It insists that physicians must not give eugenical advice without adequate family history data, and urges that parents should not be sensitive in the matter of taking stock of the mental limitations of their children, and finally advises that education, co-operation and the setting forth of principles and the extablishment of custom are better than legislation in promoting eugenical ends.—*H. H. Laughlin.*

2173. Miyake, K., and Y. Imai. **Digitalis no Kwasyoku oyobi sonotano Keisitu no Iden ni tuite. [On the inheritance of flower-color and other characters in Digitalis purpurea.]** [Japanese.] Bot. Mag. Tôkyô 33 (Japanese part): 175–186. 1919.—Experiments were performed on natural hybrids. The fact first discovered by Miss Saunders that glabrousness is dominant to hairiness and that the segregation of these allelomorphs takes place in 3:1 ratio was confirmed. Purpleness of stems, peduncles, etc., were found to be dominant to their greenness; their segregation takes place in 3:1 ratio. Self-fertilization of purple flower has given rise to 23 purple-flowered and 7 white-flowered plants, whence authors think that white is recessive to purple and not dominant, as it should be according to Keeble, Pellew and Jones (New Phytologist 9,1910). Authors consider that two factors *C* and *P* with their absences *c* and *p* are concerned in the production of flower-color, *P* making flowers purple in the presence of *C*.—*S. Ikeno.*

2174. Mohr, Otto L. **Character changes caused by mutation of an entire region of a chromosome in Drosophila.** Genetics 4: 275–282. May, 1919.—The appearance of notch wing (for the eighth time) was due to mutation or "deficiency" of an entire region of the sex chromosome about 4.8 units long and including many genes. Like bar-deficiency, notch allows the allelomorphic genes, even though normally recessive, to show when in heterozygous condition. Like bar-deficiency, it is lethal in males. Unlike bar-deficiency, notch exaggerates the effect of allelomorphic genes. Notch cannot therefore be mere loss or inactivation of genes, since no exaggerating effect is produced in XO males, where one sex chromosome is known to be entirely missing. No crossing over occurs within the "deficient" notch region; and crossing over is disturbed in neighboring regions.—*Alexander Weinstein.*

2175. Mohr, O. L., and A. H. Sturtevant. **A semi-lethal in Drosophila funebris, that causes an excess of males.** Proc. Soc. Exp. Biol. Med. 16: 95–96. 1919.—In *D. melanogaster*, deficiency of females, opposite to effect of sex-linked lethals, is much less frequent and hitherto unexplained. In a race of *D. funebris*, ratios vary from all males to approximate equality. Data indicate excessive sex-limited mutation causing abnormal abdomen, which commonly affects only females, though transmitted by both sexes. Degree of abnormality is dependent on environmental conditions, as yet uncontrollable. Very abnormal females die as pupae, and excess of males results.—*C. R. Plunkett.*

2176. Morgan, T. H., and C. B. Bridges. **The construction of chromosome maps.** Proc. Soc. Exp. Biol. Med. 16: 96–97. 1919.—Accuracy of chromosome map depends upon (1) mutants and wild-type cleanly separable and equally viable; (2) loci properly spaced; (3) correction for double crossing over; (4) uniform conditions, especially of age, temperature, and crossing-over modifiers; (5) any experiment figured only once for each region of chromosome; (6) data adequate and (7) properly weighted; (8) framework of map constructed from most significant loci, others interpolated as accurately as possible.—*C. R. Plunkett.*

2177. Nachtsheim, Hans. **Die Analyse der Erbfaktoren bei Drosophila und deren zytologische Grundlage. [Analysis of the inheritance-factors in Drosophila and their cytological basis.]** Zeitschr. indukt. Abstamm. Vererb. 20: 118–156. *12 fig.* Jan., 1919.—An exhaustive and accurate review of the literature on the genetics and cytology of *Drosophila*, including nearly all papers published up to the end of 1915.—*A. H. Sturtevant.*

2178. Neethling, J. H. **A preliminary note on dwarfs appearing in Gluyas Early (wheat) hybrids.** South African Jour. Sci. 14: 540–547. *6 fig.* 1918.—Certain crosses between Gluyas Early and other common wheats produced a number of dwarf forms in the F_2 and F_3. The

plants of the F_2 generation which produced dwarf forms were somewhat shorter in height and ear length than those which yielded normal forms. The proportion of normal forms to dwarfs approached the 3:1 ratio, showing that dwarfness in this case is recessive. In every case, however, there were one to about three per cent less dwarfs produced than expected. Author ascribes this lowering of expected percentage to failure of germination and use of unskilled labor. As natural crossing occasionally takes place in wheat and dwarf segregates were found to hardly produce any seed or even head out, from an economic viewpoint the writer considers risky the growing of varieties which are liable to produce dwarf forms when naturally crossed.—*S. Boshnakian.*

2179. Porter, William C. **Huntington's chorea; a report of a family history study made in Dutchess and Putnam counties, New York.** New York State Hosp. Quart. 4: 64–74. Nov., 1918.—This paper gives a short history of pedigree investigations into Huntington's chorea. This began with Dr. Charles N. Waters, of Franklin, Delaware County, New York in 1842. Continuing, Dr. Charles R. Gorman, of Pennsylvania, reported a group of cases in 1848, and Dr. Irving Lyons, of Fairfield County, Connecticut, reported 3 cases in 1863. Dr. George Huntington, in 1872, reported studies made by himself, his father and grandfather in Easthampton, Long Island, through a period of 72 years. The author then gives a first-hand pedigree study accompanied by Chart A, "The W——— Family." In this family group 56 persons are charted, 19 of whom had Huntington's chorea and 13 of whom were still, at the time of the report, below the age of 35, which is taken as the average age of incidence. Chart B records 49 persons, of whom 15 had chorea and 2 were indicated as below the age of incidence. Chart C records 25 members of the family-tree, of whom 7 had Huntington's chorea and 9 are recorded as below the average age of incidence.—*H. H. Laughlin.*

2180. Rasmuson, Hans. **Zur Genetik der Blütenfarben von Tropaeolum majus. [On the genetics of the flower colors of Tropaeolum majus.]** [German.] Bot. Notiser 1918: 253–259. Nov., 1918.—Dark yellow crossed with light yellow gave dark yellow in F_1 and approximately 3 dark yellow to 1 light yellow in F_2. Light yellow bred true in F_3, dark yellow gave some populations containing only dark yellows and some containing approximately 3 dark yellow to 1 light yellow. Red crossed with yellow gave red in F_1 and approximately 3 red to 1 yellow in F_2. Homozygotes were dark red and heterozygotes light red, and in each class 2 sub-classes existed according as red was borne on dark or light yellow base. In F_3 dark red gave only dark reds, yellow gave only yellows, and light red gave approximately 3 red to 1 yellow. Existence of different genetic types of red is considered self-evident. On account of technical difficulties only small populations were secured throughout.—*R. E. Clausen.*

2181. Rasmuson, Hans. **Über eine Petunia-Kreuzung. [On a Petunia cross.]** [German.] Bot. Notiser 1918: 287–294. 1918.—In 1915 author made several crosses between forms of *Petunia hybrida* (the product of *P. nyctagini flora* Juss. × *P. violacea* Lindl.). One of these has been followed to the F_2 generation. P_1 female had almost white flowers with blue throat and anthers. P_1 male had violet flowers with yellow throat and anthers. F_1 generation produced four different types: I. Violet, blue anthers, blue throat, 15 plants; II. Violet, yellow anthers, yellow throat, 15 plants; III. Dark red-violet, blue anthers, blue throat, 10 plants; IV. Dark red-violet, yellow anthers, yellow throat, 2 plants. These are assumed to belong to two genotypes, the first comprising types I and III, the second, types II and IV, giving a segregation ratio of 25:17 for blue, as contrasted with yellow, anthers and throat, thus indicating that one P_1 plant was heterozygous for these characters.—Five F_2 families were grown: A-1, A-2, B-1, B-2, C-1. Progeny in each showed 2 classes for flower color, viz., dark violet or red-violet and pale-colored, the ratio in each family and in the summation of families, closely approximating the 3:1 ratio. Possibility of genotypic differences within each class noted. Among the pale-colored plants of families B-1 and B-2 was found a difference in color of the nerves on the outside of the corolla. They were either dark violet or green (3 were greenish and pale violet below) in the ratio 3:1. As for anther color, the progeny of F_1 plants with yellow anthers were yellow while the progeny of blue-anthered

F_1 plants segregated into blue and yellow in the ratio 3:1. Considering flower color and anther color simultaneously 4 classes appear: dark flowers, blue anthers; dark flowers, yellow anthers; pale flowers, blue anthers; pale flowers, yellow anthers, in a ratio close to 9:3:3:1. The gene for dark flower color and the gene for blue anther color are not linked. Anther color and throat color are conditioned by the same gene.—*E. B. Babcock.*

2182. Rasmuson, H. **Zur Frage von der Entstehungsweise der roten Zuckerrüben. [On the origin of red sugar beets.]** Bot. Notiser **1919**: 169–180. *2 fig.* 1919.—Some red sugar beets were planted in a place where no pollination by other sorts could occur. Four of these plants gave together 456 red, 182 yellow and 201 white ones. These numbers indicate, as also shown by Kajanus, the segregation 9:3:4. Some of the plants produced had appearance of fodder beets. The red plants had a smaller content of sugar than the white ones in the same parcel. Among the offspring of the red plants there was great variation (6–16.8 per cent) in amount of sugar, undoubtedly due to genotypical differences, consequently fodder-beets were segregated as to all qualities analyzed. Probably the original red sugar beets were F_1 plants from the combination, sugar beet × fodder beet.—*K. V. Ossian Dahlgren.*

2183. Renner, O. [Rev. of: Baur, E. **Mutationen von Antirrhinum majus. (Mutations of Antirrhinum majus).** Zeitschr. indukt. Abstamm. Vererb. **19**: 177–193. *10 fig.* June, 1918. (See Bot. Absts. 2, Entry 1198.)] Zeitschr. Bot. **11**: 212–214. 1919.

2184. Renner, O. [Rev. of: (1) Haecker, V. **Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. (Developmental analysis of characters, (Phaenogenetics.) General problems of development, heredity and eugenics.)** *x + 344 p., 181 fig.* Gustav Fischer: Jena, 1918. (See Bot. Absts. 1, Entry 1216.)] (2) Idem. **Entwicklungsgeschichtliche Vererbungsregel. (Embryological analysis of characters or of races.)** Zeitschr. indukt. Abstamm. Vererb. **14**: 260–280. 1915. (3) Idem. **Über eine entwicklungsgeschichtliche Vererbungsregel. (On an embryological rule of heredity.)** Zeitschr. indukt. Abstamm. Vererb. **18**: 1–21. 1917.] Zeitschr. Bot. **11**: 201–205. 1919.

2185. Roberts, H. F. **Darwin's contribution to the knowledge of hybridization.** Amer. Nat. **53**: 535–554. Nov.–Dec., 1919.—Darwin observed that crossability is not determined by systematic affinity, and noted the differential facility of making reciprocal crosses, (which he compares with differential success of reciprocal grafts), and the differential fertility of hybrids produced thereby; but the degree of facility of crossing is no measure of fertility of hybrid produced. He was surprisingly familiar with facts of self-sterility and felt that the problem was far from solved. He clearly visualized hybrid vigor (height and weight) as proportional to degree of difference (not necessarily external differences) between parents of the cross, whether or not they had been crossed or selfed during previous generations. He observed increased resistance and earlier flowering of hybrids and explained them as due to the fact that forms used in the cross had been exposed to different conditions, bringing a differentiation in their sexual elements (he thought this explained self-sterility also), and claimed to have proved that if such differentiation had not taken place the different flowers on the same plant did not bring vigor, even when these flowers differed in appearance. Relative weight of seeds produced by a cross and a selfing was 100:96; relative germinating ability was dubious. In crosses among 57 species of 52 genera, relative height of hybrids to inbreds was as 100:86. Hybrid vigor was transmitted to F_2, and was sometimes accompanied by decreased fertility. He was not much interested in transmission of characters to hybrids and says that intermediacy is the usual thing, sometimes "prepotency," and "some characters refuse to blend." He got in F_2 a ratio of 88:37 but did not visualize 3:1. Prepotency "sometimes depends on the same character being present and visible in one parent and latent or potentially present in the other. "Reversion was the coming to light of a latent character." "The elements of both parent species exist in every hybrid in a double state, namely, blended together and completely separated." "When two hybrids pair, the combination of pure gemmules derived from the one hybrid with the pure gemmules of the same

parts derived from the other would necessarily lead to complete reversion of a character.—Hybridized gemmules derived from both parent hybrids would simply reproduce the original hybrid form." "Act of crossing tends to bring back long lost characters not proper to the immediate parent form." He observed somatic segregation in F_1 and doubted whether the length of time a character had been inherited had any influence on its fixedness. He also observed sex-linked inheritance.—*Merle C. Coulter.*

2186. Roberts, Herbert F. **The contribution of Carl Friedrich von Gärtner to the history of plant hybridization.** Amer. Nat. **53**: 431–445. Sept.–Oct., 1919.—Selected quotations and brief comments. In 1836 Gärtner received a prize for the first satisfactory demonstration of fact of hybridization in plants; 1849, published results of 25 years' work, involving 10,000 separate experiments in crossing. Classed hybrids: (1) intermediate types,—occasional cases where one parent contributed more strongly being due to "slight overbalance of one or other fertilization materials;" (2) commingled types, each parent contributing certain characters; (3) decided types, one parent being prepotent. Visualized determination of hybrid characters as due, "not to mass and relationship of germinal materials," but to "vital modification of formative force." Essential nature of a species consists in definite relation of its sexual forces to other species (crossability), not necessarily in morphological features. No thought of unit characters; hybrid types "must be compared in their totality." Variation in F_2 described but not explained. Identical results of reciprocal crosses emphasized. Decided against xenia in corn, unfortunately using pericarp color, but got positive results with peas (yellow and green seeds). Emphasized necessity of pure parent types, and repetition of experiments using different individuals. Hybrid vigor seen clearly, and its agricultural possibilities considered.—*Merle C. Coulter.*

2187. Salmon, C. E. **Papaver Rhaeas, P. dubium and the hybrid between them.** New Phytol. **18**: 111–117. *7 fig.* Mar.–April, 1919.—Author presents evidence indicating that wild plants at first taken to represent a variety of *Papaver dubium* are hybrids between *P. dubium* and *P. Rhaeas.* Significant characters of parents and hybrids are listed and conclusion is drawn that some characters of the hybrids belonged to one parent, some to the other, whilst a few were perfectly intermediate. The hybrids were completely sterile.—*T. H. Goodspeed.*

2188. Salmon, C. E. **A hybrid Stachys.** Jour. Linnean Soc. London (Bot.) **44**: 357–362. *1 fig.* May 16, 1919.—Paper is of taxonomic interest chiefly. *S. germanica* is 75 cm. high; *S. alpina* is 60 cm.; *S. digenea,* a natural hybrid between the two, is 107 cm.—*Merle C. Coulter.*

2189. Salmon, E. S. **On forms of the hop (Humulus lupulus L.) resistant to mildew (Sphaerotheca humuli (DC) Burr.); II.** Jour. Genetics **8**: 83–91. Apr., 1919.—Continuation of earlier experiments (Jour. Agric. Sci. **8**: 455, 1917) which indicated that certain individual seedlings of wild hop, obtained from Vittorio, Italy, and female variety with yellow leaves known as "golden hop" were both resistant to attacks of Hop-mildew (*Sphaerotheca humuli* (DC.) Burr). Inoculation experiments with these two groups of "immune plants" continued with the result that seedlings of first group when grown in greenhouse were immune as regards leaf and stem during two consecutive seasons although when planted out in the hop garden susceptibility appeared late in the growing season in the case of leaf and "hop." Greenhouse plants may show local susceptibility without the general immunity being lost. In second group the yellow-leaved female variety is found to be immune while corresponding male variety is susceptible.—*T. H. Goodspeed.*

2190. Schmidt, Johannes. **Der Zeugungswert des Individuums beurteilt nach dem Verfahren kreuzweiser Paarung. [Individual potency, based on experiences in cross-matings.]** *8 vo., 40 p.* Gustav Fischer: Jena, Germany. 1919.—Translation from a Danish manuscript, dealing with inheritance of quantitative characters. Knowledge of individual potency often has great theoretical or practical significance, for instance in the selection of individuals for

further breeding. The methods and investigations here described may have a practical application, so that the book has special value for plant and animal breeders, as well as for the geneticist. [From publisher's announcement, Zeitschr. Bot. 11: cover page 4. 1919.]—*Geo. H. Shull.*

2191. Schmidt, Johs. **Racial studies in fishes. II. Experimental investigations with Lebistes reticulatus (Peters) Regan.** Jour. Genetics 8: 147–153. *1 graph.* June, 1919.—The author is working on the question whether, or to what extent, quantitative racial characters are hereditary. The tropical-American Cyprinodont *Lebistes reticulatus* (Peters) Regan, a little aquarium fish, was used because it breeds rapidly, and the young possess at birth the full number of vertebrae, dorsal rays, etc. The experiments fall into two groups. In the first, the temperature of the water was varied for one pair of parents from one period of pregnancy to the other and the number of rays in the various broods counted. The results show that the different broods do exhibit a difference in the number of dorsal fin rays, and the number of rays was greater where the young had been developed at a high temperature than where their development took place at a lower temperature. In the second, different pairs of parents were kept in the same environment, the same water. One set of parents both had 6 rays and in the other set both had 8 rays. The tables show that the average number of rays approximates that of the parents, respectively, and is therefore genotypical in nature. The author concludes that a fish "race" is largely a statistical conception, implying a mixture of genotypes, with the environment acting only secondarily.—*R. K. Nabours.*

2192. Schmidt, J. **Investigations on hops (Humulus lupulus). XI. Can different clones be characterized by the number of marginal teeth in the leaves?** Compt. Rend. Lab. Carlsberg 14: 1–23. *8 fig.* 1918.—A statistical study was made of difference in number of marginal teeth on terminal lobes of leaves borne on secondary axes to determine whether the variations were an expression of genotypic differences or were merely phenotypic. The leaves studied were obtained from plants of the same clone observed through three different years, plants from the same clone grown under different external conditions in the same year, plants from different clones, and from hybrid plants the parents of which showed great divergence in respect to the character under consideration. Author concludes that although the number of teeth in the margin of leaves of the hop plant is largely affected by environment, nevertheless there are differences between clones in respect to the number of leaf-teeth, which are independent of external conditions.—*W. W. Stockberger.*

2193. Seiler, J. [Rev. of: Doncaster, L. **Chromosomes, heredity and sex: A review of the present state of the evidence with regard to the material basis of hereditary transmission and sex-determination.** Quart. Jour. Microsc. Sci. 59: 487–521. 1914.] Arch. Zellforsch. 15: 141–143. 1919.

2194. Seiler, J. **Chromosomenstudien an Mischlingen. [Chromosome studies on hybrids.]** [Rev. of: Federley, Harry. (1) **Die Chromosomenconjugation bei der Gametogenese von Smerinthus populi var. austanti × populi. Ein Beitrag zur Frage der Chromosomenindividualität und der Gametenreinheit. (Chromosome conjugation in the gametogenesis of Smerinthus populi var. austanti × populi. A contribution to the individuality of the chromosomes and purity of the gametes.)** Öfversigt Finska Vetensk. Soc. Forhandl. 57: 1–36. 1914–1915.—(2) Idem. **Die Spermatogenese des Bastards Dicranura erminea ♀ × D. vinula ♂. (Spermatogenesis of the hybrid Dicranura erminea ♀ × D. vinula ♂).** *Ibid.* 57: 1–26. 1914–1915.—(3) Idem. **Die Spermatogenese des Bastards Chaerocampa porcellus ♀ × elpenor ♂. (Spermatogenesis of the hybrid Chaerocampa porcellus ♀ × elpenor ♂).** *Ibid.* 58: 1–17. 1915–1916.] Arch. Zellforsch. 15: 137–139. 1919.

2195. Seiler, J. [Rev. of: Haase-Bessell, Gertraud. **Digitalisstudien I. (Digitalis studies I.)** Zeitschr. indukt. Abstamm. Vererb. 16: 293–314. 1916.] Arch. Zellforsch. 15: 143. 1919.

2196. Seiler, J. [Rev. of: Harrison, J. W. H., and L. Doncaster. **On hybrids between moths of the geometrid sub-family Bistoninae, with an account of the behaviour of the chromosomes in gametogenesis in Lycia (Biston) hirtaria, Ithysia (Nyssia) zonaria and in their hybrids.** Jour. Genetics **3**: 229–248. 1914.] Arch. Zellforsch. **15**: 139–140. 1919.

2197. Sheward, T. **How varieties of fruit and flowers are originated.** Gard. Chron. Amer. **23**: 118. *1 fig.* 1919.—Brief directions for amateur plant breeders accompanied by a popular presentation of the theories involved.—*John Bushnell.*

2198. Slocum, Rob. R. **Standard varieties of chickens. III. The Asiatic, English, and French classes.** U. S. Dept. Agric., Farmers' Bull. 1052. *32 p., 31 fig.* 1919.—Brief, popular, illustrated descriptions of Asiatic, English and French fowl as they are bred in America.—*H. D. Goodale.*

2199. Snyder, N. **Wheat breeding ideals.** Jour. Amer. Soc. Agron. **10**: 113–119. 1918.—A discussion of the great value of wheat as a food is given and it is pointed out that for generations man must have so considered it and thus propagated wheat as his chief bread-making cereal. It is held that in wheat improvement bread-making quality should always be considered and no new wheat be recommended on account of its high yield or other characters unless it possesses high bread-making qualities. The quantity and quality of gluten should be considered.—*H. H. Love.*

2200. Stakman, E. C., H. K. Hayes, Olaf S. Aamodt, and J. G. Leach. **Controlling flax wilt by seed se'ection.** Jour. Amer. Soc. Agron. **2**: 291–298. *Pl. 9.* 1919.—See Bot. Absts. 3, Entry 2766.

2201. Stark, P. **Die Blütenvariationen der Einbeere. [Floral variations of Paris quadrifolia.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 241–303. *35 fig.* Aug., 1918.—Variations in floral structure are described. The whorls of leaves, sepals, petals, anthers and carpels, normally in groups of 4, may undergo local changes of metamorphosis, splitting, increase or decrease of members, or the arrangement of whorls may be changed. There is a high degree of positive correlation between the number of members in various whorls. Increase of members of each whorl begins with the leaf whorl and progresses towards the carpels, while the reverse is true of decrease of members. These flower variations are due to nutrition, space relations of the growing point, and anatomy of fibrovascular bundles. Author concludes that above phenomena are of phylogenetic significance and believes that the floral diagram of *Paris* is a development from the *Trillium* type.—*Karl Sax.*

2202. Sumner, Francis B. **Adaptation and the problem of "organic purposefulness."** II. Amer. Nat. **53**: 338–369. July–Aug., 1919.—A continuation of a paper of a somewhat philosophical nature, considering first, trial and error in regulation, and second, evolution and contingency. Author asserts trial and error principle is the only explanation of adaptive responses where racial or individual experiences are lacking. Cites arguments from Jennings, Holmes, and Roux, indicating trial and error applicable to physiological processes. Prefers to believe invisible trial and error processes involved in morphogenesis, rather than abandon to a vitalistic interpretation. Gene-character relationship is not indicative that entire organism is developed by such "particle" combination. Sequence-space relationship is still to be explained. Bodies both inorganic and organic tend to maintain functional equilibrium, the intervening "fortuitous" steps being proportionate to specific complexity—e.g., regeneration of a crystal; regeneration of a mutilated organism; solution of a problem by the mathematician. Random responses of organism in new situation is inversely proportional to complexity of problem since the greater the complexity, the greater the number of racial experiences entering into the situation, and the greater the number of reactions that may have been selected. Author suggests that in evolution, inheritance of environmental modifications and selection of variations have both occupied a place. Unfavorable environment may disturb

germinal material so that new variations arise in direction of need, assuming that there may have been previous adaptive modifications of the "parent-body." Defends thesis that special adjustment between organism and environment arose by chance, although chance is not to be defined as "uncaused." Author objects to considering genetics synonymous with Mendelism. [See Bot. Absts. 3, Entry 2518.]—*L. B. Walton.*

2203. Svedelius, N. E. **Generationsväxlingens biologiska betydelse. [The biological importance of the alternation of generations.]** Botaniska Sektionens af Naturvetenskapliga Studentsällskapets i Uppsala förhandlingar. Svensk Bot. Tidskr. **1918**: 487–490. Mar. 19, 1919.—Author criticizes theory of Bower and Wettstein on the origin of alternation of generations as connected with the vegetable kingdom's transition and accommodation from life in water to life on land. Among the Phaeophytes the same development concerning the relative condition between gametophyte and sporophyte is to be seen as in the ferns and seed plants. This circumstance however is in these algae not connected with radically changed external conditions of life.—The principal importance of the reduction-division is to make possible new combinations of the chromosomes. (1) When fertilization is compensated by *one* reduction division only two different combinations of chromosomes are possible. (2) When fertilization is compensated by *many* reduction-divisions (several mother cells) a great number of combinations are possible.—The origin of a diploid sporophyte by postponement of the reduction division furnishes possibilities for the plant to produce a large number of reduction divisions and by this an increased number of combinations of allelomorphs. Thus the genesis of higher types as a result of this fertilization is made possible.—The theory is supported by the distribution of the two types in the vegetable kingdom. Type 1 includes: Flagellates, Diatomeae centricæ, Conjugates and Chlorophyces, haplobiont Rhodophyces and Phycomycetes. Type 2 contains: Diatomeae pennatae, diplobiont Rhodophyces, Thaeophyces, Myxomycetes, Ascomycetes and Basidiomycetes (3) and all Bryophytes, Gymnosperms and Angiosperms.—Type 1 (one fertilization and one reduction division) thus includes more primitive and simply organized forms of plants. Type 2 (one fertilization and many reduction divisions) contains plants which really have reached a higher degree of evolution. —Possibly the evolution has gone from *haploid haplobionts* (*Spirogyra* type) to *haploid* and *diploid diplobionts* (*Dictyota* type) and finally to *diploid haplobionts* (*Fucus, Plumbagella* and other phanerogams).—*K. V. Ossian Dahlgren.*

2204. Sylvén, N. **Några anmärkningsvärde enar. [Some peculiar specimens of Juniperus communis.]** Skogsvårdsföreni. Tidskr. **1918**: 656–662. *6 fig.* 1918.—Author describes a spontaneous variation of *Juniperus communis* from Tulseboda in Blekinge (southern Sweden), that agrees with the cultivated *Juniperus communis pendula* (*B. reflexa* Parl.).—*K. V. Ossian Dahlgren.*

2205. Transeau, Edgar Nelson. **Science of plant life.** *14 × 19 cm., v + 336 p., 194 fig.* World Book Co.: New York, 1919.—Pages 220–228 contain six short paragraphs on "plant breeding," "variations," "two kinds of variation," "mutation," "hybridization" (17 lines in which Mendelian inheritance is only vaguely suggested), and "selection." On p. 325 is also a short paragraph on "plant breeding and evolution."—*Geo. H. Shull.*

2206. Van Fleet, W. **New everbearing strawberries.** Jour. Heredity **10**: 14–16. *2 fig.* Jan., 1919.—Several varieties of strawberries in which the runners are largely suppressed and successive fruiting crowns formed are all descendants of Pan American, a sport or mutation of the Bismark, a variety of *Fragaria virginiana* type. This everbearing tendency appears in some of the hybrids and seedlings of Pan American. Progressive and Superb are the most popular varieties though they may be deficient in productiveness and plant-making capacity. Seedlings from present everbearing varieties, and crosses with spring-fruiting commercial varieties and varieties of the European Alpine strawberry, *Fragaria vesca*, which naturally fruits over a long season have been made with the hope of developing varieties of additional value. *F. vesca* in the European and Mexican Alpine forms has rarely proved worth cultivating.—Several seedlings of the *F. vesca* type from seeds forwarded by W. F. Wight from Chile,

showed greater vigor, fruitfulness and general adaptation than any Alpine hitherto introduced. Plants under the introduction No. 35005 have been disseminated in a limited way for trial. Crosses between it and Chesapeake and Early Jersey Giant were made under glass and 400 of the seedlings which fruited in June, 1917, showed high average as June-fruiting varieties, but with no obvious tendency toward continuous fruiting. Runners from two of the best were brought into bloom and again pollinated with 33005 and of 150 seedlings, 4 bore handsome large berries continuously from July until November and a good supply of vigorous runners. If then, the everbearing Pan American is a mutant, it is evident that everbearing forms may be obtained from other sources. [See Bot. Absts. 2, Entry 732; 3, Entry 74.]—*M. J. Dorsey.*

2207. VAN FLEET, WALTER. Progress in breeding Freesias. Jour. Internat. Gard. Club **3**: 232–239. June, 1919.—Author notes that "the original wild *F. refracta* was introduced into cultivation about 1816. It has a rather tortuous horizontal scape, with 5 or more blooms, bulging corolla tubes pointing irregularly up or down, and is lurid greenish-yellow with pronounced orange blotch, rather than clear white in its coloring." Florists soon started improvement. Forty years ago a superior variety appeared which had larger foliage and well shaped, almost pure white flowers, though retaining the deep yellow blotch. It came to be known as *F. refracta alba*, and it has since become the common garden variety. Further selection developed the pure white variety "Purity."—The yellow of the *F. refracta* was unpopular. A vigorous garden variety was found in a neglected Italian garden, which produced large well shaped blooms, with wide tubes, sulphur to deep yellow in color, free from greenish shades. It was named *F. Leichtlinii*. From it has been bred a charming yellow variety *F. Chapmanii*. By crossing *F. Leichtlinii* with *F. Armstrongii*, a new pink-flowering species, there has lately arisen some remarkable apricot-colored or flaming orange varieties.—Pink forms have been offered by nurserymen, but they are not well established and prove to be variants of *F. refracta alba*.—Author's work has been with *F. Armstrongii*, hybridizing it with other species. He has secured a large range of colors, including brilliant yellow, bright orange, copper red, various pink shades, rosy purple, and violet blue. Variations have also been obtained in form and color plan so that some resemble "star phlox" while others show indications of doubling. A desirable variation is a two-ranked cluster, which somewhat resembles an enlarged Trailing Arbutus. The best of the new varieties are usually sterile but may be propagated by corms. [See also anonymous rev.: Gard. Chron. **66**: 95. 1919. (See also Bot. Absts. 3, Entry 2077.)]—*C. E. Myers.*

2208. VON HOFSTEN, N. Ärftlighetslära. [Genetics.] *17 × 26 cm., viii + 506 p., 191 fig. 1 colored pl.* P. A. Norstedt & Söners förlag: Stockholm, 1919.—This text-book is divided into five sections. In the first section—"phenotype and genotype,"—author treats the theory of transformation and of continuation, norm of reaction and modifications, the difference between personal qualities (phenotype) and genotypical constitution, pure lines and populations, and other related questions.—The second section (14 chapters) treats of hybridization. After an explanation of the principles of Mendelism the author points out very particularly the relation between genetic qualities and exterior properties, polymeric factors, presence-absence-hypothesis and the nature of the factors, attempting to differentiate between factors —the formal units,—and genes, the real units, the nature of which is unknown. After treating of linkage phenomena, species hybrids, etc., this section ends with a chapter "On the traditional views of inheritance in the light of modern genetics," in which the author explains and criticizes such expressions as variation, correlation, latency and atavism.—The third section deals with cytology, giving schematic tables (originals) and treats of the reduction division and different opinions about its nature; discusses segregation of hybrids as a cytological procedure (Morgan's crossing-over hypothesis); considers the experiments of Federly and others on the origin of constant hybrids, etc. Then follow three chapters on inheritance of sex and the chromosomes which determine sex. The author is not satisfied with the rather complicated sex formulae of Goldschmidt and criticizes his potency hypothesis. Author uses the formulae ♀ *FF*, ♂ *Ff* resp. ♂ *MM*, ♀ *Mm*, which formulae correspond with cytological facts; he holds however that the sex-chromosomes do not determine sex itself and that un-

known and higher factors must exist which regulate the mechanism of the chromosomes and thereby determine sex.—Next follows a very extensive chapter on the development of new biotypes. The author explains in a very logical manner and by schematic illustrations existing possibilities for induction of a variation in descendants, similar to a variation of the parents caused by an outside impulse (modification in the embryonic state, "direct parallel-induction or modification," "direct parallel-induction of mutation," "indirect parallel-induction of mutation," and transmitting of a personal variation), and comes to the conclusion that no inheritance of modifications (acquired characters) takes place. He thus rejects the Lamarckian view and agrees with the opinion of the exact geneticists, but thinks it possible that some phenomena especially the "indirect induction of mutations," will form a connection between the views of exact genetics and Lamarckian ideas. The experiments of Kammerer are strongly criticized. Three chapters deal with mutations, their nature and origin. Author criticizes not only all superficial observation but also such esteemed investigations as Tower's experiments with *Leptinotarsa* and the American *Drosophila* experiments.—This section closes with an explanation of the relation between the theory of inheritance and theories of evolution, the importance of selection, and other evolutionary questions. Author points out that too little is known about mutations for discussing their relation to evolution, but theoretical possibilities must be considered.—In the fourth section the author discusses the importance of modern genetics for plant and animal breeding. In the last section he writes about the importance of the same principles for the human race. Referring to tables of pedigrees (partly carefully revised and more instructive than those in the original works) the author recounts some kinds of Mendelizing qualities in man, considers polymeric cases (criticizing rather severely Davenport's opinion on the mulatto-question), and discusses sex-limited qualities of man. The last chapter is a well-written and moderate presentation of race-hygienical questions and aims.—*K. V. Ossian Dahlgren.*

2209. Waldron, L. R. **Cross-fertilization in alfalfa.** Jour. Amer. Soc. Agron. 2: 259–266. 1919.—Two species of *Medicago, sativa* and *falcata,* were planted together in equal numbers to secure data on the amount of cross-fertilization taking place between the two species. Flowering records in the F_1 generation showed that the gametes of the *M. sativa* parent plants had united with gametes from the *M. falcata* plants to form mature sporophytes from *M. sativa,* to the extent of 7.48 per cent. From *M. falcata* 42.70 per cent of hybrid plants were produced. The disparity was due probably in the main to the comparative scarcity of both flowers and pollen in *M. falcata.* A slight, but perhaps significant, negative correlation was found to exist between amount of seed produced in the parent plants and the extent of cross-fertilization.—*F. M. Schertz.*

2210. Warburton, C. W. **The occurrence of dwarfness in oats.** Jour. Amer. Soc. Agron. 11: 72–76. *2 fig.* 1919.—In the course of studies of selections from certain oat varieties grown in head rows at the Aberdeen (Idaho) substation in 1916, one row of Victory oats produced 12 normal plants of the variety and 8 of an entirely distinct type, these 8 being simply dense tufts of basal leaves with occasional culms not over 9 inches in height, bearing very small panicles. These dwarf plants for the most part failed to mature seeds before frost, though watered and protected from injury. All seeds produced by both tall and dwarf plants in this row were saved.—The few seeds from dwarf plants of previous year were sown in 1917, and all viable ones produced dwarf plants exactly like parents. About 40 seeds from each of 10 of the 12 tall plants were sown in individual plant rows. Four of these 10 plants produced all tall plants and 6 produced both tall and dwarf plants, in the ratio of 2.55 to 1. Some rows, however, showed an exact 3 to 1 ratio.—In 1918, at Aberdeen, seed from the rows producing all tall plants in 1917 again produced all tall plants in 1918, the seed from dwarf plants in segregating rows produced dwarf plants, showing that dwarfness in this strain is recessive.—All the seeds from both the tall and dwarf plants in one segregating row were sent to Dr. H. H. Love at Cornell University and from another row to Prof. H. K. Hayes at the Minnesota Station. The seed from the remaining 4 rows were planted by the author.—Summarizing the results obtained at Ithaca, Aberdeen, and St. Paul, 65 tall plants out of 168 produced in

1917 from 6 families proved to be homozygous for tallness and 103 proved to be heterozygous, a preponderance of homozygous plants, as the expected numbers are 56 and 112. The 103 heterozygous plants produced 1536 tall and 514 dwarf plants, almost an exact ratio of 3 tall to 1 dwarf.—No adequate explanation of the sudden appearance of this dwarf form has yet been found.—*J. M. Beal.*

2211. Warren, Ernest. **The pure line hypothesis and the inheritance of small variations.** South African Jour. Sci. 15: 535–567. *Pl. 16.* 1919.—Author crossed a tall nasturtium (*Tropoeolum majus*) with large, uniform green leaves and pale yellow flowers as ovule parent with a dwarf variety (*T. minus*) with small variegated leaves and red flowers. Eleven of the twenty-one hybrids had over 90 per cent good pollen. The remaining ten had only from 2 to 41 per cent good pollen and produced, on the average, fewer seeds, of which a smaller average percentage germinated. The author considers it likely that defective ovules were associated with the bad pollen. Low fertility and poor germination were also encountered on selfing the pollen parent. The tall habit and unvariegated leaves were dominant over the dwarf habit and variegated leaves. Segregation occurred in both cases in approximately a 3 : 1 ratio. The two factors were linked in inheritance [the data indicating about 21 per cent crossovers]. Size of leaves did not segregate in a clear-cut fashion but was correlated closely with tallness and to a less extent with non-variegation, even among those with the same habit. There were clear indications of segregation in regard to yellow chromoplasts and red sap pigment but the mode of inheritance could not be determined from the data, there being a number of seemingly unaccountable cases. The progeny of different F_1 plants differed considerably in average degree of variegation, leaf width and intensity of red in the flowers. In the last case the correlation between F_1 parent and F_2 progeny was found to be 0.435. The author interprets the occurrence of these heritable fluctuations adversely to the pure-line theory.—*Sewall Wright.*

2212. Whipple, George Chandler. **Vital statistics: An introduction to the science of demography.** *12 × 18 cm. v + 517 p., 63 fig.* John Wiley and Sons: New York, 1919.—The book is an elementary treatment of the methods and material of vital statistics, including chapters on statistical arithmetic, graphs, enumeration and registration, general death rates, birth rates, marriage rates, specific death rates, causes of death, analysis of death rates, statistics of particular diseases, studies of death by age periods, probability, correlation, and life tables. The book is evidently intended for a popular text book, efforts are made to keep the subject from being "dry," and special emphasis is laid on the real and supposed fallacies of statistics.—*Sylvia L. Parker.*

2213. Whitby, Stafford. **Variation in Hevea brasiliensis.** Ann. Botany 33: 313-321. *1 diagram.* July, 1919.—Determinations of the rubber-content of the latex, the rubber-yield, and the trunk-girth for the individual trees of a population of 1011 7-year old trees being tapped by a V-cut on half the circumference at a level of about 30 inches, and forming an apparently normal area of plantation rubber in the Malay States, showed the following results.—(a) The rubber-content of the latex ranged from 23 to 55 per cent. The mean value was 36.58 ± 0.25 per cent, σ 5.86 ± 0.17 per cent, C.V. 16.02 ± 0.49 per cent. (b) The rubber-yield for a given tree remained approximately constant. The frequency curve referring to rubber-yield showed a marked positive skewness. Mean yield, 7.12 ± 0.115 grams, σ, 5.425 ± 0.08. Mode (by inspection), 4 grams C.V., 76.19 ± 1.14 per cent. Coefficient of skewness (on σ), + 0.575. As indicating the character of the yield distribution, it is noted that, on the one hand, 9.6 per cent of the trees (trees giving twice the mean yield or more) was contributing 28 per cent of the total yield, and, on the other hand, 13.7 per cent of the trees (trees giving 0.2 gram) was contributing only 2.9 per cent of the crop. The highest yielders in the population were 4 trees giving from 41 to 43 grams per diem. (c) The correlation between trunk-girth and latex-yield is positive, but not very high, being + 0.260 ± 0.020.—*S. Whitby.*

2214. Whiting, P. W. **Inheritance of white-spotting and other color characters in cats.** Amer. Nat. 53: 473–482. Nov.–Dec., 1919.—Previous work by author on inheritance in cats is summarized, and in addition new findings are added. The inheritance of various types of ticking and of the different degrees of white-spotting (including self-white) are discussed. Restricted white spotting is considered dominant to self-pigmented. Self-white is also dominant to self-pigmented.—"The principle is suggested that there is a quadruple allelomorphic series: *W*, solid white; w^m, much spotted; *wl*, little spotted; and *w*, self, with dominance in the degree of decreasing pigmentation."—*H. L. Ibsen.*

2215. Whiting, P. W. **Genetic studies on the Mediterranean flour-moth, Ephestia kühniella Zeller.** Jour. Exp. Zool. 28: 413–445. *2 pl., 1 fig.* July 5, 1919.—Taxonomy, distribution, source of the material used and technique are discussed. Low fertility due mostly to defective oviposition was experienced. Variations in size are apparently not hereditary, while characters relating to leg spines and external male genitalia have not been tested. Environment appears to affect inheritance of defective labial palpi. The abnormality of cleft tongue is inherited but depends on environmental conditions, among which humidity is important, for its expression. In color inheritance sooty is a simple dominant to type, and black a simple recessive, while in the homozygous black moths sooty acts as a recessive. This the author considers a case of reversed dominance due to a simple Mendelian difference. Variations in quantity of a color producer and a color inhibitor are supposed to determine color variations, and a chart illustrating this conception accompanies.—*R. K. Nabours.*

2216. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Monthly Bull. State Comm. Hortic. California 7: 568–573. Oct., 1918.—Practice of planting commercial apple orchards in alternate varieties to cause normal development of fruit is upheld. No benefit is derived in size, color, shape or quality, from foreign pollen. Conclusions based on results of hand-pollinations of varieties Ben Davis, Jonathan, Winesap and Grimes.—*T. H. Goodspeed.*

2217. Yamaha. [Rev. of: Allard, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of Nicotiana rustica.** Amer. Nat. 53: 234–238. 1919. (See Bot. Absts. 2, Entry 1195; 3, Entry 217.)] Bot. Mag. Tôkyô 33: 166–167. 1919.

2218. Yamaha. [Rev. of: Weatherwax, P. **Gametogenesis and fecundation in Zea mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73–90. 1919. (See Bot. Absts. 2, Entry 717.)] Bot. Mag. Tôkyô 33: 165–166. 1919.

2219. Zalla, M. [Rev. of: Benard, R. **Neuf cas de polydactylie héréditaire au cours de cinq générations. La polydactylie dans ses rapports avec les lois de Mendel. (Nine cases of hereditary polydactyly in five generations. Polydactyly in its relation to Mendel's law.)** Nouvelle Iconogr. Salpêtrière 28^{2-3}: 1916–1917.] Riv. Patholog. Nerv. Ment. 24: 127–128. 1919.

2220. Zeleny, Charles. **A change in the bar gene of Drosophila involving further decrease in facet number and increase in dominance.** Jour. Gen. Physiol. 2: 69–71. Sept. 20, 1919.—In a "downward" selection experiment with "bar"-eye stock of *Drosophila melanogaster* (bar eye being characterized by a small number of facets), author obtained an "ultra-bar" mutant giving rise to a race having about one-third as many facets as bar. Ultra-bar acts as a dominant allelomorph of bar and has a much greater degree of dominance over normal than has bar. It probably represents a "second mutation in the same germinal material and in the same direction as a previous mutation." It occurred in the direction of selection.—*Chas. W. Metz.*

HORTICULTURE

J. H. Gourley, *Editor*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

2221. Anonymous. **Annual poppies at Wisley, 1917.** Jour. Roy. Hortic. Soc. **43**: 483–487. 1919.—A report of the trial of 56 stocks of annual poppies at Wisley, England, in 1917. A list of the varieties, brief descriptions and the awards of the committee are given.—*J. K. Shaw.*

2222. Anonymous. **Bulbs in fiber.** Gard. Chron. Amer. **23**: 15. 1919.

2223. Anonymous. **Decorative perennials for continuous bloom.** Gard. Chron. Amer. **23**: 75. 1919.

2224. Anonymous. **Delphiniums at Wisley, 1917.** Jour. Roy. Hortic. Soc. **43**: 462–477. 1919.—Three plants each of 229 stocks of perennial Delphiniums were received for trial at Wisley, England, in the autumn of 1915. Brief descriptions of the different varieties are given, also the awards of the committee.—*J. K. Shaw.*

2225. Anonymous. **Eradicating European barberry.** Gard. Chron. Amer. **23**: 15. 1919.

2226. Anonymous. **A review of yellow roses.** Gard. Chron. [London] **65**: 81, 92–93. 1919. —A review of the work done on developing yellow roses giving the good and bad points of the varieties now in cultivation. Shows progress that has been made in the last 20 years, but concludes that no entirely satisfactory yellow rose has been produced. A large list of varieties with short descriptions is given.—*H. C. Thompson.*

2227. Anonymous. **Mysotis at Wisley, 1917.** Jour. Roy. Hortic. Soc. **43**: 478–482. 1919. —A report of the trial of 101 stocks of Mysotis at Wisley, England, in 1916–17. A list of the varieties, brief description and the awards of the committee are given.—*J. K. Shaw.*

2228. Anonymous. **Phoenix Roebelinii.** Gard. Chron. Amer. **23**: 15. *1 fig.* 1919.

2229. Anonymous. **The best of the Forsythias.** Horticulture **29**: 426. *1 fig.* 1919.

2230. Anonymous. **Weeping trees.** Gard. Chron. Amer. **23**: 17. *1 fig.* 1919.

2231. Anonymous. **Standard roses.** Gard. Chron. Amer. **23**: 17. *1 fig.* 1919.

2232. Anonymous. **The new hydrangeas.** Gard. Chron. Amer. **23**: 72. *1 fig.* 1919.

2233. Anonymous. **The box-barberry.** Gard. Chron. Amer. **23**: 43. *1 fig.* 1919.

2234. Anonymous. **The Fraxinella (Dictamnus albus).** Gard. Chron. Amer. **23**: 205. *1 fig.* 1919.

2235. Anonymous. **The valuable Japanese yew.** Horticulture **29**: 443. *1 fig.* 1919.

2236. Anonymous. **Trailing arbutus bush.** Amer. Bot. **25**: 27. 1919.—*Abelia grandiflora* is shown to be hardy in northern Illinois. Though killed to the ground each year it produces new shoots and many flowers every season.—*W. N. Clute.*

2237. Anonymous. **Utility of rhododendrons.** Gard. Chron. Amer. **23**: 12, 13. *3 fig.* 1919.

2238. Anonymous. **[Rev. of: Report of the National Botanic Gardens, Kirstenbosch, 1916–18.]** South African Gard. and Country Life **9**: 309. 1919.

2239. Anonymous. **Plants in the aroid house.** Missouri Bot. Gard. Bull. 7: 35–38. *Pl. 7.* 1919.—A list of 172 species and varieties of aroids.—*O. T. Wilson.*

2240. Anonymous. **The Iceland poppy.** Gard. Chron. Amer. 23: 162. *1 fig.* 1919.

2241. Bean, W. J. **Deutzia compacta.** Curtis Bot. Mag. 15: *Pl. 8795* (*colored*). 1919.—A shrub, native of China, from three to six feet in height, with white flowers tinged with rose; it flowers in July after danger of late frosts has passed and is one of the latest of Deutzias to flower, coming at a season when shrubs in flower are scarce, thus enhancing its value.—*Oliver A. Farwell.*

2242. Bowles, E. A. **Monograph for an amateur gardener's library.** Jour. Roy. Hortic. Soc. 43: 359–371. 1919.

2243. Buswell, W. M. **Spurred butterfly pea.** Amer. Bot. 25: 112. 1919.

2244. Charles, Mrs. M. E. S. **Germination of wild cucumber.** Amer. Bot. 25: 66. 1919.—Seeds of *Echinosystis lobata* do not germinate well if kept dry over winter, but seeds that had been lying on a cement floor for a year produced thrifty vines the second spring.—*W. N. Clute.*

2245. Clute, Willard N. **The opening of flowers.** Gard. Chron. Amer. 23: 87–88. 1919.

2246. Clute, Willard N. **Causes that produce the colors of plants.** Gard. Chron. Amer. 23: 232. 1919.

2247. Clute, Willard N. **The structure of plants.** Gard. Chron. Amer. 23: 278–279. 1919.

2248. Clute, Willard N. **The science of flower-gathering.** Gard. Chron. Amer. 23: 127. 1919.—Methods of prolonging the life of cut flowers are discussed.—*W. N. Clute.*

2249. Clute, Willard N. **Defining double flowers.** Gard. Chron. Amer. 23: 189. 1919.

2250. Clute, Willard N. **Flowers that are not flowers.** Gard. Chron. Amer. 23: 49–50 1919.—Composites and other flower clusters are discussed.—*W. N. Clute.*

2251. Clute, Willard N. **Hardy houseleeks.** Amer. Bot. 25: 68. 1919.—*Sempervivum. tectorum* reported as enduring temperatures of −20°F. in northern Illinois. The plants are noted for seldom blooming, but these plants bloomed the following year.—*W. N. Clute.*

2252. Correvon, H. **Icones florae alpinae plantarum.** [Illustrations of alpine flora.] II[9]. *29 p., 17 pl., 25 fig., 14 distribution maps.* [No date; copy received June 2, 1919.]—See Bot. Absts. 3, Entry 2972.

2253. Correvon, H. **Icones florae alpinae plantarum.** II[10]. *36 p., 16 pl., 25 fig.* 16 distribution maps. [No date; copy received June 2, 1919.]—See Bot. Absts. 3, Entry 2973.

2254. Cremata, Merlino. **Cercas, alambradas y setos en Cuba.** [Fences and hedges in Cuba.] Revist. Agric. Com. y Trab. 2: 330–334. 1919.—The plants suitable for hedges in Cuba are described under the headings defensive hedges, hedges for adornment, for shelter and for fruit. Bibliography appended.—*F. M. Blodgett.*

2255. Donald, James. **The rock garden.** Gard. Chron. Amer. 23: 190, 191. *2 fig.* 1919.

2256. Easlea, Walter. **Mildew resistant roses; with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. 43: 253–260. 1919.—This paper is a discussion of breeding roses for mildew resistance. A list of varieties more or less resistant to mildew is appended. [See Bot. Absts. 3, Entry 2119.]—*J. K. Shaw.*

2257. Farr, Bertrand H. **The peony and its people—from amateur to professional.** Flower Garden 6: 102. 1919.

2258. Fielder, C. R. **Trees and shrubs for autumn and winter effect.** Jour. Roy. Hortic. Soc. 43: 340–345. 1919.

2259. Hatfield, T. D. **Endurance of coniferous trees at Wellesley, Mass.** Horticulture 29: 125–126. 1919.—Upwards of 75 species and forms of conifers listed, with notes on their resistance to the winter of 1917–1918.—*W. N. Clute.*

2260. Hutchinson, J. **Rhododendron auriculatum.** Curtis Bot. Mag. 15. *Pl. 8786* (*colored*). 1919.—A white flowered species of central China, being the latest to flower both in its native habitat and in gardens. It may become the source of races of late flowering hardy hybrids. At Kew it has been fertilized by the pollen of belated flowering forms of *R. Ponticum* Linn. and of *R. decorum* Franch. Flowers fragrant. Leaves finest of all Rhododendrons. Hardy in the valley of the Thames. Should be protected from the midday sun.—*Oliver A. Farwell.*

2261. Hutchinson, J. **Rhododendron callimorphum.** Curtis Bot. Mag. 15. *Pl. 8789* (*colored*). 1919.—A rosy red species of *Rhododendron* from south western Yunnan where it grows at an elevation of 10,000 feet. Fairly hardy in England. The long petioles of the cordate, ovate-orbicular leaves are conspicuously covered with long stalked glands. An upper leaf is sometimes reduced and spatulate as in the section *Azalea* of the Genus.—*Oliver A. Farwell.*

2262. Hutchinson, J. **Primula tibetica.** Curtis Bot. Mag. 15. *Pl. 8796* (*colored*). 1919.—A rose-purple flowered species allied to *P. siberica* and a native of the Sikkim and Bhutan Himalayas. A pronounced yellow eye and gibbous bracts are distinctive features of this species.—*Oliver A. Farwell.*

2263. Hutchinson, J. **Primula bellidifolia.** Curtis Bot. Mag. 15. *Pl. 8801* (*colored*) 1919.—This plate represents a species of the *Capitata* with violet colored corollas and is considered to be the East Himalayan representative of *Primula farinosa* Linn. It is distinguished by its doubly toothed, membranous leaves, strigose pubescent on both surfaces.—*Oliver A. Farwell.*

2264. Hutchinson, J. **Rhododendron oleifolium.** Curtis Bot. Mag. 15. *Pl. 8802* (*colored*). 1919.—A low shrub, not over 2–3 feet in height, native of Yunnan at altitudes of 6000–10,000 feet. The flowers, white to pale rose, are solitary and axillary; the shrub may flower when 2 years old. Probably will prove to be a hardy Rhododendron. Related to *R. racemosum* from which it is distinguished by longer and more narrow leaves.—*Oliver A. Farwell.*

2265. Hutchinson, J. **Desmodium cinerascens.** Curtis Bot. Mag. 15. *Pl. 8805* (*colored*). 1919.—The species figured is a native of western China and bears rose carmine flowers late in the season (October). A hardy shrub, 3 or 4 feet high, with purplish twigs. It may be increased by late summer cuttings. It is related to *D. tiliaefolium*, *D. nutans*, and *D. argenteum* of India.—*Oliver A. Farwell.*

2266. Johnston, Earl Lynd. **The sand lily.** Amer. Bot. 25: 52–54. 1919.

2267. Judd, Wm. H. **Ornamental trees and shrubs of merit for New England.** Horticulture 29: 175. 1919.

2268. Lodurizus. **Arboles para tapar medianerias.** [Trees for boundary lines.] Informacion Agric. [Madrid] 9: 59. 1919.—*Cupressus*, *Eucalyptus* and *Populus* are recommended for good soils and the elm for poorer situations.—*John A. Stevenson.*

2269. Lodurizus. **Los rosales no deben podarse en invierno. [Roses should not be pruned in the winter.]** Informacion Agric. [Madrid] **9**: 9–10. *1 fig.* 1919.—Early spring considered the best time for pruning roses. Proper procedure to be followed for best results outlined.—*John A. Stevenson.*

2270. Lodurizus. **Rosa wichuriana.** Informacion Agric. [Madrid] **9**: 177. 1919.—The growing of this rose recommended because of hardiness, adaptability, and color range.—*John A. Stevenson.*

2271. Lodurizus. **Multiplicacion del crisantemo. [Chrysanthemum propagation.]** Informacion Agric. [Madrid] **9**: 121–123. 1919.—Describes the method of propagating by cuttings.—*John A. Stevenson.*

2272. Lodurizus. **Setos vivos. [Hedges.]** Informacion Agric. [Madrid] **9**: 150–151. *1 fig.* 1919.—*Maclura aurantiaca, Crataegus pyracantha* (espino ardiente) and *Rosa* sp. are recommended for planting. Methods of planting and cultivation are outlined.—*John A. Stevenson.*

2273. Main, M. Emerson. **Cultivating wild flowers.** Flower Grower **6**: 32. 1919.

2274. Matouschek. [Rev. of: von Tubeuf, **Gärtnerische Kultur der Mistel. (Culture of mistletoe.)** Mitteil. Deutsch. Dendrol. Ges. **1917**: 188–196. *8 pl.* Zeitschr. Pflanzenkrankh. **29**: 57–59. 1919.

2275. Meyer, Frank B. **The peony, the modern garden flower.** Gard. Chron. Amer. **23**: 303. 1919.

2276. Nelson, J. C. **A freak foxglove.** Amer. Bot. **25**: 88–89. *1 fig.* 1919.—The garden form of *Digitalis purpurea* known as *gloxinioides* (*monstrosa*) is figured and described.—*W. N. Clute.*

2277. Nelson, William. **Native Plants: Crotalaria sp.** South African Gard. **9**: 224. 1919.

2278. Orr, Helen. **Garden flowers of springtime.** Gard. Chron. Amer. **23**: 193. 1919.

2279. Pescott, Edward E. **The Australian flora from an ornamental aspect.** Jour. Dept. Agric. Victoria **17**: 360–364. *Pl. 4.* 1919.—Several varieties of wattle (*Acacia*) are described which serve for ornamental purposes. They are adaptable to almost any soil, except where stable manure is used. The natural habitat is a hard dry stony soil, it does not thrive under excessive moisture conditions.—*J. J. Skinner.*

2280. Rolfe, R. A. **Isabelia virginalis.** Curtis Bot. Mag. **15**: *Pl. 8787 (colored).* 1919.—An epiphytic orchid of the tribe *Epidendreae* but with the habit of a *Maxillaria.* Native of Brazil. Flowers single rather inconspicuous, white, flushed with rose; pseudobulbs covered with scales.—*Oliver A. Farwell.*

2281. Rolfe, R. A. **Bulbophyllum robustum.** Curtis Bot. Mag. **15**: *Pl. 8792 (colored).* 1919.—An epiphytic orchid from Madagascar belonging to the tribe *Epidendreae.*—*Oliver A. Farwell.*

2282. Rolfe, R. A. **Govenia lagenophora.** Curtis Bot. Mag. **15**: *Pl. 8794 (colored).* 1919.—A Mexican terrestrial orchid with yellow and reddish-brown flowers on purple pedicels.—*Oliver A. Farwell.*

2283. Rolfe, R. A. **Liparis macracantha.** Curtis Bot. Mag. **15**: *Pl. 8797 (colored).* 1919.—One of the largest flowered species of the genus and a native of Formosa. It has large undulate leaves and a long raceme of vinous-purple flowers with very large serrate lips.—*Oliver A. Farwell.*

2284. Rolfe, R. A. **Wittia Panamensis.** Curtis Bot. Mag. 15: *Pl. 8799 (colored).* 1919. —These plants have stems like those of *Epiphyllum* but bear rather small deep purple flowers which appear at the bases of the crenations. This species is a native of Panama; *W. Amazonica* is a Peruvian species and is the generic type. A third species, *W. Costaricensis,* is found on the west coast of Costa Rica.—*Oliver A. Farwell.*

2285. Rolfe, R. A. **Calanthe tricarinata.** Curtis Bot. Mag. 15: *Pl. 8803 (colored).* 1919.—This is a terrestrial Orchid of the tribe *Epidendreae* and is a native of northern India and Japan where it is found at altitudes of from 5000 to 9000 feet. The flowers are yellowish green with a brownish red lip. This species and *C. Masuca* are the parents of the garden hybrid, *C. Harryana.*—*Oliver A. Farwell.*

2286. Roth, Richard. **Yucca.** Horticulture 29: 104. *1 fig.* 1919.

2287. Sheward, T. J. **How to propagate bedding plants by cuttings.** Gard. Chron. Amer. 23: 47. *1 pl.* 1919.

2288. Sheward, T. **How to propagate perennials by cuttings and divisions.** Gard. Chron. Amer. 23: 170. *1 fig.* 1919.

2289. Sheward, T. **Sowing seed for next year.** Gard. Chron. Amer. 23: 77. *1 fig.* 1919.

2290. Skan, S. A. **Ipomoea dasysperma.** Curtis Bot. Mag. 15: *Pl. 8788 (colored).* 1919. —Peculiar to the genus in having yellow flowers and saccate outer sepals. An attractive garden plant native in Tropical Asia and Africa. Has had many names, including, probably *I. saccata* Hallier f.—*Oliver A. Farwell.*

2291. Skan, S. A. **Ipomoea Pes—tigridis var. longibracteata.** Curtis Bot. Mag. 15: *Pl. 8806 (colored).* 1919.—This variety comes from East Tropical Africa and is a climbing annual, reaching 6 feet or more. The flowers are white with the tube purplish without and violet within. It belongs to the section *Cephalanthae* characterized by the rather small flowers being arranged in dense bracteate heads. The typical species has a wide range extending from East Tropical Africa through southern Asia to China and the adjacent coastal Islands. It prefers a sandy soil.—*Oliver A. Farwell.*

2292. Smith, A. **Berry-bearing plants and their ornamental value.** Gard. Chron Amer. 23: 9–11. 1919.—All the berry-bearing plants likely to grow in the northern United States, with notes on their usefulness as ornamentals, are mentioned.—*W. N. Clute.*

2293. Smith, Arthur. **The proper treatment of flowering shrubs.** Gard. Chron. Amer. 23: 196. 1919.

2294. Staff, Otto. **Protea longifolia.** Curtis Bot. Mag. 15: *Pl. 8993 (colored).* 1919.— A species of southern Africa that has had a cultural history approaching two centuries and as might be imagined has been described under a number of different names now reduced to syonymy. Three species, still kept distinct, *P. ignota, P. ligulaefolia* and *P. umbonalis* were based upon plants raised from seed at Schönbrunn. These are kept distinct from *P. longifolia* on the shape of the centre of the flowering head, length of the perianth-arms, and the coloring of the involucral bracts. Andrews considered them as but forms of *P. longifolia* and it is suggested that the differences are such as may be expected under the favorable conditions of our climate, the heads not developing perfectly and normally.—*Oliver A. Farwell.*

2295. Turrill, W. B. **Lonicera similis, var. Delavayi.** Curtis Bot. Mag. 15: *Pl. 8800 (colored).* 1919.—This is a climbing, yellow flowered shrub of western China. It is a hardy evergreen, flowering as late as August. It thrives well in a loamy soil and can be increased by late summer cuttings.—*Oliver A. Farwell.*

2296. Turrill, W. B. **Lonicera chaetocarpa.** Curtis Bot. Mag. 15: *Pl. 8804* (*colored*). 1919.—This species is a native of western China and is related to *L. hispida* Pall. of which it was originally considered to be a variety. A hardy shrub, about 5 feet in height, that bears yellow flowers and thrives well in any good loamy soil. It may be increased by cutting in July and August. Flowers in June.—*Oliver A. Farwell.*

2297. Watkins, S. L. **The western azalea.** Amer. Bot. 25: 51. 1919.

2298. Wilson, E. H. **A curious twist of facts about laurel.** Horticulture 29: 602. 1919. —A note in favor of protecting the State flower [*Kalmia*] of Connecticut.—*W. N. Clute.*

2299. Wright, C. H. **Aloe concinna.** Curtis Bot. Mag. 15: *Pl. 8790* (*colored*). 1919.—A species of *Aloe* first discovered at Zanzibar but not since found in a wild state. It has increased by suckers and flowers in the autumn; a weak, erect or ascending, short stem is developed with small scattered leaves closely set with silvery white spots; an inclined inflorescence is suggestive of a more or less prostrate habit in the wild plants. It is of the section *Monostachyae.*—*Oliver A. Farwell.*

FRUITS AND GENERAL HORTICULTURE

2300. Anonymous. **Protecting tender plants over winter.** Gard. Chron. Amer. 23: 21. 1919.

2301. Anonymous (J. K. R.) [Rev. of: Bailey, L. H. (Editor). **Standard cyclopedia of horticulture, vol. VI, S–Z;** with Supplement. *P. 3043–3639, fig. 3516–4056.* 1919.] Jour. Botany 57: 198–200. 1919.

2302. Anonymous. **The best strawberries for different locations.** Horticulture 29: 417. 1919.

2303. Anonymous. **The Asiatic crabapples.** Gard. Chron. Amer. 23: 198. *3 fig.* 1919.

2304. Anonymous. **What of the Pacific Islands?** [Rev. of: (Anonymous?). **The Pacific Islands.** McCarron Stewart and Co.: Sydney, New South Wales, 1919.] Tropical Life 15: 66–67. 1919.—Mostly a discussion of the production of cocoanuts on these Islands.—*H. N. Vinall.*

2305. Anonymous. **Riego y fertilizacion de los arboles nuevos.** [Irrigation and fertilization of new trees.] Informacion Agric. [Madrid] 9: 106–107. *1 fig.* 1919.—A method of applying water and fertilizer dissolved in the water through a tube and funnel to newly planted trees to avoid waste and loss by surface evaporation.—*John A. Stevenson.*

2306. Anonymous. **California Date Association builds packing house at Coachella.** California Citrograph 4: 348. *1 fig.* 1919.—A detailed description with illustration is given of a new and modern packing house erected by the Date Growers Association for the purpose of handling the rapidly increasing date crop of the Coachella Valley.—*J. E. Coit.*

2307. Anonymous. **Further study needed on time for picking frozen lemons.** California Citrograph 4: 140. 1919.—It is pointed out that tests of lemons to determine the composition of sound and frozen lemons with special reference to the effect of slow thawing on frozen lemons conducted by H. S. Bailey and C. P. Wilson, and published on by them in Journal of Industrial and Chemical Engineering, show results different from those of Young and Thomas. Their tables show that the specific gravity of stored frozen lemons is much closer to normal fruit than it is to the frozen fruit remaining on the tree. The entire difference may possibly be accounted for in the fact that the fruit which Bailey and Wilson used in their tests was picked January 7, beginning about daylight and immediately after the freeze, while the fruit used by Young and Thomas was picked January 13 after the freeze which came on the night of January 6.—*J. E. Coit.*

2308. Anonymous. **Pomona growers ask relief from court on heating law.** California Citrograph 4: 325, 326. 1919.—In order to test the constitutionality of the anti-orchard-heating ordinance which was adopted at a referendum election in Pomona, California in April, 1919, an application has been made for an injunction to restrain the Mayor and Chief of Police from enforcing its provisions. [Note. The corporate limits of the City of Pomona include 8700 acres of orange and lemon groves, much of which is under the jurisdiction of the Pomona Valley Orchard Protective Association.]—*J. E. Coit.*

2309. Audas, J. W. **The litchi.** Jour. Dept. Agric. Victoria 17: 371–373. *Pl. 1.* 1919. —The litchi (*Nephelium Litchi*) is described as an evergreen growing from 15 to 20 feet high and bearing a delicious fruit. There are 13 species native in Australia. Its propagation is discussed.—*J. J. Skinner.*

2310. Barss, H. P. **Some prune troubles of non-parasitic nature.** Proc. Oregon Hortic. Soc. 1918: 52–58. 1919.—This paper was printed in Better Fruit 13^7: 7–8, 24–26 (1919), under the title "Prune troubles of non-parasitic nature."

2311. Bean, W. J. **Malus rivularis.** Curtis Bot. Mag. 15: *Pl. 8798* (*colored*). 1919.— One of the crab apples native of western North America where it is the only species. Fruits are ellipsoid, yellowish tinged with pink or green, and without the calyx lobes at the apex.— *Oliver A. Farwell.*

2312. Bonnier, Gaston. [Rev. of: Ruby, Joseph. **Recherches morphologiques et biologiques sur l'olivier. (Morphological and biological studies on the olive.)** *400 p. 16 fig.*] Compt. Rend. Acad. Agric. France 5: 307–308. 1919.—A careful study of the external characters and anatomy of the various parts of the olive tree, as well as the development, flowering, fruiting, and various physiological functions. Analyses are given of the oil and ash content of fruits from various sources and of the ash content of the different parts of the plant, especially with relation to the different varieties and their variation under different conditions. This is followed by a monograph of the known varieties of olives.—*E. A. Bessey.*

2313. Blair, W. Saxby. **Dusting fruit trees for insects and disease.** Agric. Gaz. Canada 6: 16–18. 1919.—See Bot. Absts. 3, Entry 2572.

2314. Boon, C. L. **Restoring an old orchard.** Gard. Chron. Amer. 23: 42–43. 1919.

2315. Bowles, E. A. **The effect of the frosts of the winter of 1916–17 on vegetation.** Jour. Roy. Hortic. Soc. 43: 388–461. 1919.—The winter of 1916–17 was most severe of any since 1894–5 and the author presents a discussion of the characteristics of the winter and a long list of plants, giving the degree of injury if any, at various places in Great Britain and Ireland. The information was collected by means of questionnaires and an outline of conditions at each of some 70 points of observation is given.—*J. K. Shaw.*

2316. Brown, G. G. **Fertilizer tests for strawberries.** Oregon Agric. Exp. Sta. Bull. 159. *15 p., 2 fig.* 1919.—See Bot. Absts. 3, Entry 1782.

2317. Brown, Gordon G. **Hood River strawberry fertilizer tests.** Better Fruit 13^9: 14–16, 33–34. March, 1919.—Nitrate of soda, superphosphate, and sulphate of potash were tested as fertilizers for strawberries during the seasons 1916, 1917 and 1918. A fair average increase in yields was obtained from plots on which nitrate of soda was applied either (1) during blossoming time or (2) twice, early in the spring and at blossoming time. The value of leguminous cover crops, especially clover, is also emphasized. A table of results is appended.—*A. E. Murneek.*

2318. Brown, Gordon G. **Experiments with nitrate of soda as a fertilizer for orchards in the Hood River Valley, Oregon.** Proc. Oregon Hortic. Soc. 1918: 107–112. 1919.—This is a review of recent observations by the author respecting the value of nitrate of soda as a fertili-

zer for apples in the Hood River valley. Two successive annual applications of 5 to 6 pounds of nitrate of soda per tree in early March resulted in increase in vigor of trees, as expressed by terminal growth and leaf development. Percentage of fruit set doubled and trebled in many instances. Further applications were not proportionately successful, thus bringing to the forefront considerations of the many factors influencing growth and productivity of the trees. Consideration is given to the effects of soil culture, irrigation, cover crops and fertilizers upon the blooming habit and yields of apples. No definite conclusions are drawn by the author.—*A. E. Murneek.*

2319. Chace, E. M. **The detection and elimination of frosted fruit.** California Citrograph **4**: 108, 109, 144. *3 fig.* 1919.—There are at least three different methods of determining the extent of frost damage to oranges. 1. Estimating the damage by surface indications (not dependable); 2, the hesperidin crystal test (very accurate but hardly suited for commercial work); 3, specific gravity test. This last is the one in most common use. Description is given of the water separator specific gravity machine used in most packing houses for segregating fruit frozen in different degrees. Tables are presented giving data on a series of tests of these machines as operated in many packing houses. It is pointed out that some frozen oranges are heavier than some sound oranges and this troublesome variation operates against the accuracy of any device which is based on specific gravity The conclusions are that if all frozen oranges were lighter than all sound oranges and the machine properly operated, 85 per cent efficiency would be shown, whereas with fruit as it is the average efficiency of 5 machines was 74 per cent.—*J. E. Coit.*

2320. Charmeaux, François. **L' ensachage du raisin de table, son origine, ses raisons, ses rěsultats. [The bagging of grapes, its origin, reasons and results.]** Jour. Soc. Nation. Hortic. IV, **20**: 52–56, 75–79. March and April, 1919.—The author gives his experience and reviews the work of numerous French viticulturists and investigators on bagging table grapes, and compares the results with spraying. His conclusions are that sprays should not be used for table grapes and that the only practical method of protecting the fruit from diseases and insects is to bag the bunches of grapes. No definite reason is given for not using sprays except that discriminating buyers do not buy grapes that have been sprayed. Paper covering is claimed to protect the grapes against injury by birds. Results of use of paper of various colors also given.—*H. C. Thompson.*

2321. Childs, Leroy. **Some comparative results in controlling codling moth and apple scab with dust, spray gun and rod.** Proc. Oregon Hortic. Soc. **1918**: 112–118. 1919.—See next following Entry, 2322; also Bot. Absts. 3, Entry 2599.

2322. Childs, Leroy. **Comparative results in controling codling moth.** Better Fruit 13^9: 5, 41–46. March, 1919.—See Bot. Absts. 3, Entries 2321, 2599.

2323. Condit, I. J. **Proper maturing of avocados.** Ann. Rept. California Avocado Assoc. 1918–1919: 78–83.—The concensus of opinion is overwhelmingly in favor of some kind of maturity standard for avocados. Analyses of the fruit show that the oil increases with ripening, but the correlation between the percentage of oil and the best edible quality has not been determined. Continued sale of immature windfalls is likely to injure the market. Sketches are given of the present legal maturity standards for oranges, grapes, olives, and cantaloupes. It is concluded that on account of the peculiar nature of the avocado, being a salad fruit, none of these maturity standards would be advisable. It is suggested that inasmuch as varieties have already been classified according to season, that the committee on classification and registration of varieties be authorized by the directors to submit recommendations as to the earliest dates at which the fruit of all commercial varieties can be considered properly mature. Members of the association may be asked to sign an agreement not to pick and ship the fruit of any commercial variety before the maturity date specified for that variety. The containers could then be plainly labeled "Mature Avocados, Guaranteed by the California Avocado Association."—*J. E. Coit.*

2324. Coons, G. H. **Bordeaux mixture.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 18–19. *6 fig.* Aug., 1919.

2325. Cordley, A. B. **Possible causes of "sour sap" in the Pacific Northwest.** Better Fruit 13[12]: 6, 30–32. May, 1919.—Pathological condition of fruit trees, locally known as "winter kill," "sour sap," or "spring injury" occurs in most of the humid sections of the Pacific Northwest. The greatest injury takes place from a short time before the opening of blossoms to three or four weeks after. The symptoms are: discoloration of cambium, withering of leaves, followed by dying of branches or of the whole tree. The writer advances a theory: "Spring injury ("sour sap") is due to acute nitrogen starvation during the most active vegetative period in the life of the tree." Lack of nitrogen in the tree is attributed to leaching of nitrates from the soil and to inhibition of the processes of nitrification. Discussion in support of the theory follows. Remedies suggested are: (1) proper cultivation of the soil to facilitate nitrification or (2) a light application of nitrate of soda shortly before blossoming time.—*A. E. Murneek.*

2326. Curtis, R. H. **Report on meteorological observations at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 316–330. 1919.—The fourteenth annual report of meteorological observation at the observatory of the Society. Air and soil temperatures, humidity, rainfall, wind and sunshine records for each month in the year are given.—*J. K. Shaw.*

2327. DeOng, E. R. **Effect of excessive sterilization measures on the germination of seeds.** Jour. Econ. Entomol. 12: 343–345. 1919.—See Bot. Absts. 3, Entry 2913.

2328. Domingo, M. Gil. **El empleo de abonas quimicas en los naranjas. [Chemical fertilizer for oranges.]** Informacion Agric. [Madrid] 9: 60.–61. 1919.—The use of sodium nitrate recommended at the rate of 1–2 kgm. per tree in two or three applications at 20–30 day intervals.—*John A. Stevenson.*

2329. Dosch, Henry E. **History and development of French walnuts in Oregon.** Proc. Oregon Hortic. Soc. 1918: 67–72. 1919.—A brief account of the history and development of the walnut industry in Oregon. Popular varieties of walnuts now grown in the state are discussed and described in detail.—*A. E. Murneek.*

2330. Durham, Herbert E. **The Lorette system of pruning.** Jour. Roy. Hortic. Soc. 43: 261–277. *Fig. 36–44.* 1919.—The method of Lorette for summer pruning apple, pear and other fruit trees is discussed on the basis of observation in the orchard of the originator near Douai, France and from 4 years' experience of the author. The purpose of the method, which is carried out from May to September, is to evoke growth from dormant eyes and to induce increased fruit-bearing near the supporting stems. By cutting back shoots at the proper stage of growth, the formation of fruit spurs is favored and increased production is secured. There is a brief discussion of the nomenclature of fruit-tree parts and a short bibliography.—*J. K. Shaw.*

2331. Eustace, H. J. **Horticultural notes.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 133. Feb., 1919.—Contains a note on fake tree doctoring by special powders placed in a hole bored in the tree.—*E. A. Bessey.*

2332. Eustace, H. J., and R. H. Pettit. **Spray and practice outline for fruit growers.** Michigan Agric. Exp. Sta. Special Bull. 93. *32 p., 6 fig.* 1919.—A discussion of the sprays to be used for controlling the insects and fungi of fruits in Michigan, method of preparation, time and manner of application, etc.—*E. A. Bessey.*

2333. Ginarte, Benjamin Muñoz. **Consideraciones sobre el cultivo de la Piña en Cuba. [Cultivation of the pineapple in Cuba.]** Revist. Agric. Com. y Trab. 2: 335–341. *7 fig.* 1919. —Historical and descriptive article. [See next following Entry, 2334.]—*F. M. Blodgett.*

2334. Ginarte, Benjamin Muñoz. **Consideraciones sobre el cultivo de la Piña en Cuba. [Cultivation of the pineapple in Cuba.]** Revist. Agric. Com. y Trab. 2: 370–377. *Fig. 8–12.* 1919.—Continuing from a previous article [See next preceding Entry, 2333.], planting, cultivating, fertilizing, harvesting, packing and the expenses and receipts of growing pineapples are discussed.—*F. M. Blodgett.*

2335. Jensen, C. A. **Some relations between citrus fruit growth and soil moisture and climatic conditions.** California Citrograph 4: 119, 131. 1919.—A report of investigations carried on at Exeter, Riverside, and Chula Vista, California and at Phoenix, Arizona to determine the effect, in the case of light soils, of more frequent irrigations on the rate of growth in volume of lemons. Irrigations with smaller amounts of water at more frequent intervals resulted in an increase in rate of growth from 18 to 27 per cent. In another experiment where the increase in frequency of irrigation applied to the first part of the season only, those with the frequent irrigation reached picking size from 24 to 30 days earlier. The data are presented by means of four graphs. It is emphasized that such differences in growth rates may not be expected on the heavier soil types or near the coast where the transpiration rates are much lower. [See also next following Entry, 2336.]—*J. E. Coit.*

2336. Jensen, C. A. **Some relations between citrus fruit growth and soil moisture and climatic conditions. Paper No. 2.** California Citrograph 4: 184, 188. 1919.—Reasoning from data presented in a previous paper the author suggests that it might be more practicable for fruit growers to determine when to irrigate by taking measurements of the rate of growth of lemons rather than by soil moisture tests. The reliability of such a method was investigated and 2 graphs are presented to show by correlation coefficients that the amount of available soil moisture is not the only factor affecting growth. Air humidity and temperature are also important factors. Hence the rate of growth of lemons may be used only as an approximate indicator of the soil moisture needs of the trees. [See also next preceding Entry, 2335.]—*J. E. Coit.*

2337. Kenhardt, Adolf. **The cultivation of the custard apple.** South African Fruit Grower 6: 203. *2 fig.* 1919.

2338. Kinman, C. F. **Observation on frost injury to avocados.** Ann. Rept. California Avocado Assoc. 1918–1919: 56–58.—Great variation in susceptibility to frost injury noted. In general, most healthy and vigorous trees showed least frost damage. Some varieties of the Mexican type withstood the cold remarkably well, even those trees growing at different points in the Sacramento and Santa Clara valleys. Among varieties especially recommended the Fuerte withstood the cold much better than the others. It is pointed out that all kinds are more or less tender while quite young. The degree of hardiness of a new variety cannot be accurately judged until after the tree has come into bearing.—*J. E. Coit.*

2339. Knight, E. E. **Why are the Guatemalan avocados best?** Ann. Rept. California Avocado Assoc. 1918-1919: 31–33. *1 fig.*—Committee on varieties has selected 8 out of a total of 158 varieties for recommendation. It is believed that all of these may be displaced with still better varieties when a larger number of the selections introduced from Guatemala will have fruited. Free hand drawing giving approximately the elevation of tablelands from the Rio Grande to the equator. Proceeding southward, no superior avocados are found south of Guatemala until Columbia is reached. Author agrees with Popenoe's estimate of Guatemalan varieties and considers them best because: "The flesh is of a deeper yellow color, smoother, more buttery texture, and richer flavor than any varieties yet known in the United States."—*J. E. Coit.*

2340. Lefferts, D. C. **Can mulching be recommended as a citrus grove method?** California Citrograph 4: 160, 161, 163. 1919.—On a very stiff red clay orchard soil which had gotten into bad physical condition the author tried a heavy mulch applied in basins including somewhat more space than the drip of large orange trees. This system was practised for 5

years with the result of larger crops with less water used but smaller sized fruit. This system largely restricted the roots to the moist mulched area. At the end of 5 years when the cost of mulching material became prohibitive a return was made to the flat system, after which the condition of the grove was much improved over what it had ever been, showing the value of the humus resulting from the mulch. No commercial fertilizer or manure was added during all the experiment. The author concludes that the experiment has improved his soil conditions very much. At the same time he has produced larger crops and more cheaply than has been the case on adjoining groves of similar soil type.—*J. E. Coit.*

2341. Lewis, C. I. **Correlation of orchard practices.** Better Fruit 13^9: *Tab. 1–8.* March, 1919.—The interrelation of pruning, tillage, fertilizing and intercropping on the vigor and productivity of fruit trees is given attention in this discussion. The effects of application of nitrate of soda on the increase in yields of apple trees is considered in detail. A summary of experimental results of fertilizer tests conducted by the Hood River and Southern Oregon Experiment Stations is given in tabular form. The following conclusions are drawn by the author: 1. An application of five pounds of nitrate of soda per tree will restore devitalized trees.—2. For best results, nitrate should be applied about a month before blossoming time. —3. The benefits of nitrate application extend over two seasons and are shown in: (a) Dark green foliage, (b) Better wood growth, (c) Improved set, (d) Increased yield, (e) Larger specimens of fruit.—*A. E. Murneek.*

2342. Lewis. C. I. **Deterioration of fruit at picking time.** Proc. Oregon Hortic. Soc. 1918: 45–49. 1919.—This paper was printed in Better Fruit 13^7: 5–7. 1919., under the title "Premature deterioration of fruit."

2343. Loree, R. E. **The culture or currants and gooseberries.** Michigan Agric. Exp. Sta. Circ. 38. *18 p., 9 fig.* 1919.—A popular account of currant and gooseberry culture.—*E. A Bessey.*

2344. Mackie, D. B. **Navel satsumas found in California.** California Citrograph 4: 60. *1 fig.* 1919.—Previous publication of the observations of Prof. Kukuchi of the Kanagawa Experiment Station, Yokahama, Japan on the appearance by mutation of a navel form of the satsuma (onshiu) orange has brought the information from A. C. Masteller of Oroville, California that certain of his satsuma orange trees possessed branches which bore this navel form. A photograph is included of specimens submitted. [See Bot. Absts. 3, Entry 2164.]—*J. E. Coit.*

2345. Matthews, C. D **Report of the division of horticulture.** North Carolina Agric. Exp. Sta. Ann. Rept. 41: 50–55. [1919.]—This is a brief report on pecan investigations, investigations with peaches, investigational work with thermal zones, variety work in pomology, native fruits of North Carolina, investigations with strawberries, the coöperative rotundifolia vineyard, investigational work with sweet potatoes, investigations with Irish potatoes, and testing South American varieties of potatoes.—*R. A. Jehle.*

2346. McBeth, I. G., and J. R. Allison. **Recent investigations in orchard heating.** California Citrograph 4: 51, 65, 67. *5 fig.* 1919.—Observations made on small lemons after cold nights indicated that the damage to fruits subjected to a given temperature for a given length of time was by no means constant Experimental results indicated that humidity was an important factor. Series of experiments were performed on lemons *in situ* by using a specially devised freezing chamber containing coils of copper tubing into which was admitted liquid CO_2. The humidity was regulated by passing the air used for ventilating through sulfuric acid or water as desired. The chamber contained thermometers and hygrometer which were read through a double glass window. Graphs are presented giving results in saturated air and in 40 per cent humidity. The time required for damage to young lemons after a temperature of 29°F. is reached is one hour, as against 30 minutes in a saturated atmosphere. The damage to the surface of the rind of the lemon is also greater in the wet condition than in the dry, showing the greater severity of freezing. Two photographs show details of the apparatus and cart for transporting it.—*J. E. Coit.*

2347. McBeth, I. G., and J. R. Allison. **Necessity for manure standardization.** California Citrograph 4: 259, 278. *2 fig.* 1919.—The problem of maintaining the organic content of citrus lands would seem to be one of the biggest problems confronting the Southern California citrus industry of today. The tremendous demand for manure combined with the limited supply has led to excessive prices on one hand and adulteration with sand, dirt, water, etc. on the other. An analytical study was made of 76 carloads bought by the Leffingwell Rancho at Whittier. The results presented in a series of graphs show that there is little correlation between cost and value. As a result of these studies the authors suggest the following method of evaluating manures in southern California, where the phosphorus and potassium content is commonly ignored. It is believed that $4 a unit for nitrogen and 5 cents a unit for organic matter is sufficiently high to cover the full value of the product to the grower, delivered at his nearest station.—*J. E. Coit.*

2348. McClelland, T. B. **Terrenos productivos e improductivos de café. [Profitable and unprofitable coffee lands.]** Porto Rico Agric. Exp. Sta. Bull. 21. *15 p. Pl. 1–2, 5 fig.* Span. Ed. 1919. [Eng. Ed. 1917.]—The hills met with in the district extending from the west coast of Porto Rico well back into the interior, produce vigorous coffee trees on the lower slopes, but near the top the trees are of poor growth with low yields. Studies were made to find the cause of this condition. It was found that liming the soil was without benefit, that the moisture content was not a contributing factor, since 0.3 per cent was the average difference in moisture content of soils from the upper and lower slopes, and finally frequent cultivation combined with application of animal manure failed to produce proper growth on the upper slopes. It appeared that the condition was due to washing away of the soil from above which is deposited on the lower slopes. The poorer areas should be devoted to forest or pasture, or if coffee is to be planted large holes should be prepared and filled with organic matter.—*John A. Stevenson.*

2349. Miller, C. C. **Injurious lemon roots.** California Citrograph 4: 356, 359. *2 fig.* 1919.—It is the custom in California to grow the lemon on sour orange stock. Frequently the lemon bud is placed too low, and after the soil accumulates above the bud union, some lemon roots will put out. Wherever this has occurred the tree deteriorates. It appears that the lemon root actually injures the tree causing the branches just above such a root to show yellow leaves. When the lemon root is cut off the tree quickly recovers.—*J. E. Coit.*

2350. Mitra, M. **Discussion of winter pruning vs. summer pruning.** Better Fruit 13^{11}: 8, 26. May, 1919.—In reply to an article in Better Fruit by C. I. Lewis, the writer discusses the relation of stored carbohydrates, particularly starch, to summer and winter pruning of fruit trees. Investigations with seedlings and large bearing trees have shown the disappearance of starch from spurs and branches during the dormant season (November to March), while an abundance of starch was found at this time in the main stem and roots. Beginning with the growing season starch appeared again in spurs and branches and was particularly plentiful around the "plant organs." Because of this cyclic movement of starch, it is pointed out that pruning should be done as much as possible during the dormant period of the tree and the least in summer time, thus saving the tree from an excessive loss of carbohydrates.—*A. E. Murneek.*

2351. Newell, Wilmon. **Citrus canker eradication in the State of Florida.** California Citrograph 4: 313, 323, 1919.—See Bot. Absts. 3, Entry 2713.

2352. Paddock, E. H. **Bridge grafting on citrus trees.** California Citrograph 4: 276, 277. *3 fig.* 1919.—Citrus trees when girdled and ruined by gum disease or pocket gophers may be saved by ordinary bridge grafting. As a result of experiments it was shown that it was more economical to save a tree by bridge grafting with sour orange wood bridges than to remove the tree and grow a new one in its place. Standard bridge grafts resulted in a quicker recovery than when sour orange seedlings were planted around the base of the injured tree and their tops grafted into the trunk above the girdled area.—*J. E. Coit.*

2353. Percy, Earl. The productive mortality of prunes. Better Fruit 13[9]: 9–10, 38–40. March, 1919.—This is a general discussion of factors causing decline in productivity of plum (prune) trees. Particular attention is paid to heart rot, root borers, general care of the trees and cultural practices, either of which may be instrumental in causing premature reduction of vitality and fruit bearing capacity of a tree. Based on statistical evidence, comparative yields of young and old trees in two counties of Oregon are given.—*A. E. Murneek.*

2354. Percy, Earl. Filbert culture a new orchard industry in Oregon. Better Fruit 13[12]: 7–8. June, 1919.—A brief discussion of the history, present status, and future possibilities of growing filberts in Oregon.—*A. E. Murneek.*

2355. Perold, A. I. The Union's viticulture industry. South African Jour. Indust. 2: 318–326. 1919.

2356. Pillsbury, J. P. Report of the division of horticulture. North Carolina Agric. Exp. Sta. Ann. Rept. 41: 56–57. [1919.]—This is a brief report of experiments with hybridization of *V. rotundifolia* with other species of *Vitis*, and investigations as to the best stocks and methods of propagation for English walnuts in the south, together with a study of walnut-hickory hybrids, investigation to determine the means of improvement of certain plum varieties, and hybridization of bramble fruits to determine varieties of raspberries suitable for the south.—*R. A. Jehle.*

2357. Popenoe, Wilson. The avocados of Mexico: A preliminary report. Ann. Rept. California Avocado Assoc. 1918–1919: 58–74. *Pl. 3–13.*—Mexico, on account of its great size and almost endless series of environmental conditions offers the greatest opportunities for avocado investigations. This paper is a report upon the first 6 months' work, the author having previously spent 16 months in Guatemala engaged in similar studies. Four chief races of avocadoes recognized, all found in Mexico. The West Indian race seems to be the true *Persea americana* of Miller, formerly known as *Persea gratissima* of Gaertner. Not yet found in an indigenous state. The Guatemalan race is also probably *Persea americana* though this is not considered as proved till indigenous trees are found. The Mexican race occurs abundantly in an indigenous state and as it appears quite distinct will probably be shown to belong to the species *Persea drimyfolia* as established in 1831 by Chamisso and Schlechtendahl. The Chinini race is suggested to include certain forms in southern Veracruz which will probably be referred to *Persea schiedeana* of Nees, reduced by Meissner in 1864 to the rank of a botanical variety of *P. americana.*

The West Indian race is adapted to lowlands near the sea while both Mexican and Guatemalan races thrive best on inland tablelands at elevations of 4000 to 6000 feet. Evidence accumulates that avocados prefer heavy clay soils. Until very recently all commercial plantations in Mexico were composed of seedlings. In productiveness the races rank as follows: Guatemalan, Mexican, West Indian, and Chinini. The Mexican race does not fully deserve the condemnation it has received in California. After visiting Atlixco in order to examine parent trees and settle a much discussed point in regard to the true classification of the Fuerte and Puebla varieties, the author concludes that Puebla is a true Mexican while Fuerte is probably a hybrid, not representative of any group but appears to be *sui generis.*—*J. E. Coit.*

2358. Popenoe, Wilson. Agricultural explorations in Mexico. California Citrograph 4: 63–71, 73. *4 fig.* 1919.—This is paper No. 3 from the Journal of Wilson Popenoe, Agricultural Explorer for the University of California. Descriptions of tropical fruits studied at Oaxaca, June 21–24; Tapachula, June 27–July 3; La Tacualpa, July 4–8; and Puerto Mexico, July 14, 1918. The following are included: The Hicaco, *chrysobalamus icaco;* Chicozapote, *Achras zapota;* Guanabana, *Annona muricata;* Papauce, *Annona diversifolia* (illustrated); Anona, *Annona squamosa; A. purpurea; A. reticulata*; Papaya, *Carica papaya;* Avocado, *Persea americana* (ill.); Pacaya, *Chamaldorea Sp.;* Jacote Maranon; *Anacardium occidentale;* Tamarindo, *Tamarindus indica;* Mango, *Mangifera indica;* Nance, *Brysonima crassifolia;*

Patashte, *Theobroma bicolor;* Pomegranate, *Punica granatum;* Cainito, *Chrysophyllum cainito;* Guava, *Psidium friedrichsthalianum;* Guayaba, *Psidium guajava;* Roseapple, *Eugenia jambos;* Pineapple, *Ananas sativus;* Toronja, *Citrus sp.;* Limoncillo, *Rheedia Sp.* Especial emphasis is placed on the possible value of the papauce.—*J. E. Coit.*

2359. Prizer, J. A. **Fertilization of citrus groves during period of high priced fertilizers.** California Citrograph **4**: 231, 255. *1 fig.* 1919.—In March, 1919, the delivered cost per unit of nitrogen varied in the different fertilizing material from $5.60 in ammonium sulfate to $17.33 in steamed bone. At the same time loose alfalfa hay could be bought at a price to yield nitrogen at $6.40 per unit. Inasmuch as alfalfa hay possesses aside from its nitrogen content a great value on account of its humus producing power, it is suggested that citrus growers should make a still greater use of alfalfa hay for fertilizing purposes.—*J. E. Coit.*

2360. Reed, H. S. **Certain relationships between the flowers and fruits of the lemon.** Jour. Agric. Res. **17**: 153–165. 1919.—The quantitative records obtained during two years study of the vegetative and fruiting cycles of seven bearing Lisbon lemon trees, growing in a commercial orchard in southern California are used as a basis for discussing (a) the seasonal distribution of fruit buds; (b) the size and productiveness of inflorescences; (c) the time required for growth of fruit and the relations of this time to the season at which the buds appear; (d) the numerical ratio of flower buds to mature fruit.—About 66 per cent of the 4545 "new buds" studied were produced in March and April; 13 per cent in November; 17 per cent between April and November and 3 per cent during winter. The number of flowers per inflorescence varied from 1 to 28. A bud on one of the many few-flowered inflorescences had a greater chance of forming a fruit than one on the few many-flowered inflorescences. Of the 4440 buds observed, 6.62 per cent produced mature fruit after 7 to 14 months. Fruit set in spring had the best chance for survival, and that set in May, June, and July required the shortest average time to attain maturity.—*A. J. Heinecke.*

2361. Reimer, F. C. **A new and effective disinfectant for pear blight.** Better Fruit 13^{10}: 24–27. Apr., 1919.—See Bot. Absts. 2, Entry 535; 3, Entry 2736.

2362. Sallmon, W. H. **The California Avocado Association: Its history and progress. President's Address.** Ann. Rept. California Avocado Assoc. **1918–1919**: 44–50.—A review of the origin and activities of the Association from its inception down to date.—*J. E. Coit.*

2363. Scott, L. B. **Varieties of the Satsuma orange.** California Citrograph **4**: 176, 199. *4 fig.* 1919.—Recent investigations in the United States and Japan have shown that the old variety name Satsuma really includes a group of varieties which differ in shape, season, and other important characters. The indiscriminate mixing of these forms is the cause of lack of uniformity in Satsuma shipments which has been objected to by the trade. Three of these subvarieties: the Owari, Ikeda, and Zairai have been identified in this country. Future plantings should be limited to one variety and the Owari is suggested as probably the best.—*J. E. Coit.*

2364. Seaton, Elwyn D. **Prune-tree culture in the great Pacific Northwest.** Better Fruit 13^{9}: 7–9. *4 fig.* March, 1919.—In this popular article special emphasis is laid upon soil culture, proper planting of trees and the development of an extensive root system. The author is a prune grower of long experience.—*A. E. Murneek.*

2365. Shamel, A. D. **Further observations upon the application of manure in citrus orchards with the furrow manure system.** California Citrograph. **4**: 332, 333. *8 fig.* 1919.—Popular.

2366. Shephera, W. P. **Packing house of Anaheim Orange and Lemon Association.** California Citrograph. **4**: 300–301, 326. *2 fig.* 1919.—Detailed description with illustrations of a large, fully equipped, modern orange and lemon packing-house in southern California.—*J. E. Coit.*

2367. SHEWARD, T. **Growing and pruning berry fruits.** Gard. Chron. Amer. 23: 304. *1 fig.* 1919.

2368. SHEWARD, T. **How varieties of fruit and flowers are originated.** Gard. Chron. Amer. 23: 118. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2197.

2369. SHEWARD, T. **How to thin fruit.** Gard. Chron. Amer. 23: 199. *1 fig.* 1919.

2370. SHEWARD, T. **Summer pruning of trained fruit trees.** Gard. Chron. Amer. 23: 240. *1 fig.* 1919.

2371. SMITH, ARTHUR. **Planting fruit trees in the garden.** Gard. Chron. Amer. 23: 84–86. *4 fig.* 1919.

2372. SOULIER-VALBERT, F. **The coconut world.** Tropical Life 15: 55. 1919.—The author claims the great consumption of margarine has made the coco-nut palm the most important food producer in the fruit kingdom. The cost of putting out a plantation of 50,000 trees is estimated $125,000. At the beginning of the seventh year the revenue will amount to 3 shillings per tree or 20 to 25 per cent on the investment.—*H. N. Vinall.*

2373. SURR, GORDON. **Yields of Washington navel oranges in relation to pruning.** California Citrograph 4: 290, 325. 1919.—In the case of 28-year old orange trees, not in thrifty condition a series of experiments lasting several years showed a greater production from lightly pruned than from heavily pruned trees.—*J. E. Coit.*

2374. THOMAS, E. E. **Frozen lemons and oranges for by-products.** California Citrograph 4: 78, 81, 104. *1 fig.* 1919.—An extensive investigation of the changes taking place in frozen citrus fruits. Sound and badly frozen oranges and lemons were picked every 4 days following a freeze, for a period of $2\frac{1}{2}$ months, and were weighed and analyzed. These were compared with sound and frozen fruit picked immediately after the freeze and stored. Freezing kills the protoplasm changing the semi-permeable membrane to a dead porous mass, thus allowing the water of the juice to evaporate through the rind. Hence frozen fruit decreases in specific gravity. Tables are given showing results of the investigation. The actual sugars, in grams per frozen orange, decreased (probably from fermentation) from 6.5 grams to less than 2 grams. Acid also decreases in frozen fruit. Badly frozen fruit should be picked at once and sent to by-products factory. To determine the amount of injury; fruit should be picked and stored in a warm room. The sound fruit will increase in specific gravity by drying out of the rind and loss of volume with little loss of pulp juices. On the other hand frozen fruit decreases rapidly in specific gravity as the pulp juices are lost by permeating and evaporating through the rind. In from 4 to 6 days under these conditions the specific gravity test will reveal the extent of the damage.—*J. E. Coit.*

2375. TUERO, F. LOPEZ. **Vainilla. [Vanilla.]** Informacion Agric. [Madrid] 9: 79–82, 101–104, 123–127. 1919.—An extensive compilation covering a description of the various organs of the plant, floral structure, botanical classification, and history of the cultivation of the plant from the time it was first carried to France in 1793. Cultivation methods are considered and in particular the making of nurseries, methods of providing shade, and the proper way to prune. The very vital matter of artificial hand pollination is described. Finally there is discussed the picking of the beans, the various ways of curing them both natural and artificial, and the system of grading the final product. The estimated expenses and yield per hectare are outlined as well as a brief account of the composition of the vanilla bean.—*John A. Stevenson.*

2376. WALLSCHLAEGER, F. O. **Citrus production in the United States and competing countries.** California Citrograph 4: 150, 172. 1919.—The United States leads in the production of citrus fruits, a normal crop being about 80,000 carloads. Spain comes next, with 68,000; and Italy, with 58,000 carloads. The author discusses imports and exports by the

various countries and gives a table showing the United States orange and grapefruit supply. In a review of the effect of the war on citrus production in the different countries, it is noted that Palestine has been particularly hard hit, Liverpool receipts of Jaffa oranges dropping from 1,000,000 cases a year to nothing.—*J. E. Coit.*

2377. Webber, H. J., and others. **A study of the effects of freezes on citrus in California.** California Agric. Exp. Sta. Bull. 304: 245–321. *22 fig.* 1919.—An extended discussion is given of the effects produced on different varieties and species of citrus trees by the freezing temperatures occurring in California in January, 1913. The composition of the fruits of orange trees (*Citrus aurantium*) and lemon trees (*Citrus limonia*) gradually changes following exposure to freezing temperature. The specific gravity of the juice and the content of sucrose and invert sugar gradually decrease, but the ratio of sucrose to invert sugar does not change. The per cent of acid in the juice decreases slightly as a result of freezing, while the absolute amounts of acid present continues to decrease until practically none remains. Excessive loss of moisture from frozen citrus fruits takes place due to the loss of semi-permeability of the external cells. Partially frozen citrus fruits left on the tree continue to increase in size due to thickening of the rind, but the content of sugars and acid gradually decrease for several weeks.—*W. P. Kelley.*

2378. Winston, J. R., and H. R. Fulton. **The field testing of copper-spray coatings on foliage.** Better Fruit 13^{12}: 9, 27–28. June, 1919.—See Bot. Absts. 3, Entry 2786.

2379. Woodbridge, T. R. **Co-operation applied to orchard operation.** California Citrograph 4: 116, 142. 1919.—Description of the Liberty Groves Operating Corporation, which is non-stock, based on the membership plan and operated without profit. The corporation owns tools, live stock and all equipment such as tractors, etc., which are necessary and provides labor and supervision for all ordinary citrus orchard operations such as plowing, cultivating, irrigating, spreading manure, hauling, pruning, etc., except packing and selling. The corporation is financed through a revolving fund secured by assessment. Members may resign at any time and receive their unused assessments back in full.—*J. E. Coit.*

2380. Wurth, Th. **De schade aangericht door de Kloetuitbareting op de koffie-en Rubberlanden van den Kloet. [Damage to coffee and rubber by the Kloet eruption.]** Proefsta. Malang [Java] Circ. 7. *3 p.* 1919.—See Bot. Absts. 3, Entry 2789.

VEGETABLE CULTURE

2381. Anonymous. **Summer sown beets at Wisley, 1917–18.** Jour. Roy. Hortic. Soc. 43: 495–497. 1919.—A report of the trial of 81 stocks of beet sown July 11, 1917. A list of the varieties and brief descriptions of each are given.—*J. K. Shaw.*

2382. Anonymous. **Spring sown beets at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 488–494. 1919.—A report of the trial of 73 stocks of beet. A list of the varieties, brief descriptions and the awards of the committee are given.—*J. K. Shaw.*

2383. Anonymous. **Mid-season peas tried at Wisley, 1916.** Jour. Roy. Hortic. Soc. 43: 498–515. 1919.—A report of the trial of 121 stocks of peas sown March 31, 1916. A list of varieties, descriptions and notes, also the awards of the committee are given.—*J. K. Shaw.*

2384. Anonymous. **Late peas at Wisley, 1917.** Jour. Roy. Hortic. Soc. 43: 516–520. 1919.—A report of the trial of 58 stocks of peas sown at Wisley, England May 5, 1917. A list of the varieties, brief description and the awards of the committee are given.—*J. K. Shaw.*

2385. Bouquet, A. G. B. **Pollination of tomatoes.** Oregon Agric. Exp. Sta. Bull. 158. *29 p. 5 fig.* 1919.—Experiments extending through a period of six years on the pollination of tomatoes grown in greenhouses have shown that it is possible greatly to increase the yield

of fruits, earliness of fruiting, and the net profits from the crop. The emasculation method of pollinating the blossoms is especially recommended because of the ease of applying pollen, the prevention of the duplication of work and the thoroughness of pollen application at a time when the flower is most receptive. The work should be done carefully and regularly. Fruits from hand pollinated plants were harvested 21 days in advance of those not so treated. The number of unfruitful blossoms was reduced from 66 per cent to 20 per cent through efficient pollination. The net financial returns are decidedly in favor of hand pollination, since the cost of pollination for the entire season may be covered by increased yields during the first two weeks of harvesting, when higher prices for fruit prevail. [See Bot. Absts. 3, Entry 2091.]—*E. J. Kraus.*

2386. Calvino, Mario. **La mejor verdura del tropico, la chaya (Jatropha urens, var. inermis). [The best greens of the tropics.]** Revist. Agric. Com. y Trab. 2: 364–365. *1 fig.* 1919.—The leaves of the "chaya" are said to be an excellent food cooked as greens or in various mixtures. The fresh leaves contain about 1 per cent of protein, 0.25 per cent of fat and 20 per cent of carbohydrates. The plant is grown from cuttings.—*F. M. Blodgett.*

2387. Guzmanes, Antonio. **El abono del pimiento. [Fertilization of the pepper.]** Informacion Agric. [Madrid] 9: 191–192. 1919.—See Bot. Absts. 3, Entry 1786.

2388. Hodsoll, H. E. P **Some hints on the manuring of garden crops.** Jour. Roy. Hortic. Soc. 43: 346–358. 1919.

2389. Olney, A. J. **Some experiments with tomatoes.** Kentucky Agric. Exp. Sta. Bull. 218: 149–159. *5 pl., 1 fig.* Dec., 1918.—Three-year test with tomatoes gives conclusive evidence that staking and pruning reduces the yield of marketable fruit per plant but increases the yield per acre because of the greater number of plants. Tomatoes staked and pruned ripen about one week earlier than those untrained. Plants pot-grown give higher yields than those grown in flats.—*Frank T. McFarland.*

2390. Polak's Frutal Works. **Pepermunt cultuur in Nederland. [Cultivation of peppermint in Holland.]** Pharm. Weekblad. 56: 41. 1919.—See Bot. Absts. 3, Entry 1688.

2391. Waid, C. W. **Muskmelon culture in Michigan.** Michigan Agric. Exp. Sta. Special Bull. 95. *13 p., 10 fig.* 1919.

HORTICULTURE-PRODUCTS

2392. Addis, José M. **Importancia industrial de la Carica papaya (Chemburu de los brasileños; Fruta bomba en Cuba). [Industrial importance of Carica papaya.]** Revist. Agric. Com. y Trab. 2: 366–369. *7 fig.* 1919.—This is a general article on the *Carica papaya* dealing with the uses of the digestant papain which is prepared from the juice, the propagation, planting, collecting juice, and drying of juice and preparing the product for export.—*F. M. Blodgett.*

2393. Anonymous. **Castor oil production. No. 1.** Tropical Life 15: 6–7. 1919.—A compilation setting forth the statement from an American consular report that castor beans (*Ricinus communis*) grown in the Philippine Islands from seed imported from India have a higher oil content than seed of the local variety. Analysis of seed of the Indian variety showed 50 per cent of oil whereas seed of the native variety contained only 40 per cent. [See next following Entries, 2394, 2395.]—*H. N. Vinall.*

2394. Anonymous. **Castor oil production. No. 2.** Tropical Life 15: 21. 1919.—A compilation of information on yields and the oil content of castor beans. In Madras where 500,000 acres are planted to castor beans (*Ricinus communis*) the normal yield is 200 to 300 pounds per acre on dry land and 700 pounds in the more favored localities. The average yield in the United States varies from 700 to 1600 pounds per acre. A higher percentage of

oil (55.2 per cent to 56.5 per cent) is found in the larger seeded types, but the oil from the smaller seeded varieties, yielding 49 per cent, is of higher quality and is used for medicinal purposes. [See next preceding and next following Entry, 2393, 2395.]—*H. N. Vinall.*

2395. Anonymous. **Castor oil production. No. 3.** Tropical Life 15: 36–37. 1919.—A compilation concerning soils and planting practices suitable to the production of castor beans. [See next preceding Entries, 2393, 2394.]—*H. N. Vinall.*

2396. Bioletti, Fredric T., and W. V. Cruess. **Grape syrup.** California Agric. Exp. Sta. Bull. 303: 227–242. 1919.—Methods are given for the preparation of grape syrup for table, cooking and canning uses.—*W. P. Kelley.*

2397. Cabrera, Teodoro. **Tortas de carbon. Experiencia realizada en la Estacion Exp. Agronomica.** [Coal briquets.] Revist. Agric. Com. y Trab. 2: 386. 1919.—Commercial briquets are compared with those made with the resinous juice of *Enterolobium cyclocarpum* fruit, and the latter prove superior.—*F. M. Blodgett.*

2398. Condit, I. J., M. E. Jaffa, and F. W. Albro. **The carob in California, nutritive value of the carob bean.** California Agric. Exp. Sta. Bull. 309: 431–452. *8 fig.* 1919.—The anatomical parts of the carob tree (*Ceratonia siliqua*) are briefly described and the soil and climatic requirements and methods of propagation discussed. Food analyses are given of the pods and seeds of the carob.—*W. P. Kelley.*

2399. Knapp, A. W. **The fermentation of cacao.** [Reprinted from Jour. Soc. Chem. Ind. 37: 468–470. 1918.] Tropical Life 15: 83–84. 1919.—A plea for the application of chemical science to cacao production. The author indicates several ways in which improvements can be made. (a) By increasing the yield per tree from the present average 1½ to 2 pounds a year to 6 pounds per tree. (b) By the development of a machine or tool for harvesting the crop. (c) By better methods of extracting the beans from the pod. (d) By the use of mechanical transport in conveying the cacao to the fermentation house. (e) By developing uniform methods and control of fermentation processes and the utilization of the juice or "sweatings" as by-products of the fermentation. (f) By improvement in the drying machines so as to render the artificially dried cacao equal to the sun-dried product.—*H. N. Vinall.*

2400. Smith, Harold Hamel. **The London cocoa market.** Tropical Life 15: 14–16. 1919.—A compilation showing mainly the movement of the cacao bean in trade. The most interesting part is a tabulation showing the quantity of raw cocoa at London, England, and Havre, and Bordeaux, France, for the years 1916, 1917, 1918, and 1919 and the sources of the supply in each case. [See also Entries 2401, 2402, 2403, 2404, 2405.]—*H. N. Vinall.*

2401. Smith, Harold Hamel. **The London cocoa market.** Tropical Life 15: 29–32. 1919.—A continuation of the discussion in the previous number showing the movement of raw cacao in the world markets. Tabulations are given showing the imports into the United States for the years 1916, 1917, and 1918 and stocks on hand in London and Havre February 8 and January 31, respectively. [See also Entries 2400, 2402, 2403, 2404, 2405.]—*H. N. Vinall.*

2402. Smith, Harold Hamel. **The London cocoa market.** Tropical Life 15: 45–48. 1919.—Largely an appeal for the extension of the market for cocoa and chocolate and the discussion of the disposition of the cocoa crop of the West Indies. In tracing this movement it was found that 18,000 tons or 75 per cent of the total imports came from West Africa and only 2600 tons from the West Indies. [See also Entries 2400, 2401, 2403, 2404, 2405.]—*H. N. Vinall.*

2403. Smith, Harold Hamel. **The London cocoa market.** Tropical Life 15: 62–64. 1919.—A continuation of the author's previous discussion of the movement of cacao supplies from the different countries and the stocks on hand at London and Havre. [See also Entries, 2400, 2401, 2402, 2404, 2405.]—*H. N. Vinall.*

2404. SMITH, HAROLD HAMEL. **The London cocoa market.** Tropical Life 15: 78–80. 1919.—A continuation of the discussions of this subject in preceding numbers of this Journal. This article pays especial attention to the effect of the preferential duty of 7 shillings per hundred weight for British colonial cocoa. [See also Entries 2400, 2401, 2402, 2403, 2405.]—*H. N. Vinall.*

2405. SMITH, HAROLD HAMEL. **The London cocoa market.** Tropical Life 15: 93–96. 1919.—A continuation of previous discussions of the trade movements and present stocks of cacao, especially at London and Havre. An appeal is made to London buyers and manufacturers of cocoa to purchase more of the better grades from the British West Indies. [See also Entries 2400, 2401, 2402, 2403, 2404.]—*H. N. Vinall.*

2406. TRIBOLET, J. **Fruit drying.** Union South Africa Dept. Agric. Bull. Local Ser. 85: 1-11. *4 fig.* 1919.

2407. VIEHOVER, ARNO. **Chinese colza, a valuable new oilseed.** Oil, Paint and Drug Reporter 96[10]: 53. *4 fig.* 1919.—See Bot. Absts. 3, Entry 1673.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

2408. ANONYMOUS. **The anthocyanin pigments in plants and their chemical, physiological and biological functions. Review of a number of recent papers and books on the anthocyanin pigments of plants.** Sci. Amer. Suppl. 84: 2–3, 7. 1919.

2409. ANONYMOUS. [Rev. of: MALMANCHE, L. A. **Contribution a l'étude anatomique des Eriocaulonacées et des familles voisines: Restiacées, Centrolépidacées, Xyridacées, Philydracées et Mayacacées. (Contribution to the anatomical study of the Eriocaulonaceae and related families: Restiaceae, Centrolepidaceae, Xyridaceae, Philydraceae and Mayacaceae).** Thesis for the degree of doctor of science. Girault: St. Cloud, Paris, 1919.] Bull. Sci. Pharm. 26: 297. 1919.—See Bot. Absts. 3, Entry 1696.

2410. ARISZ, W. H. **De structuur van het melksapvaatstelsel bij Hevea. [The structure of the laticiferous system of Hevea.]** Arch. Rubbercult. Ned.-Ind. 3: 139–155. 1919.—Contrary to previously obtained results it is shown that the various concentric layers of latex vessels in the stem are connected. These communications are made by a single latex vessel or by more than one or by double bifurcation. The latter gives most complete communication. The larger number of layers at foot of tree is mostly due to communication layers. The laticiferous vessels in main root are continuations of same vessels in stem. Where lateral root is formed the outer lacticiferous vessels degenerate and only deepest layers continue in lateral root. In lateral branches the number of laticiferous layers depends on age. Secondary and tertiary lateral branches have only one laticiferous layer from which the latex cannot flow to the tapping cut because the continuation of this layer in the stem has degenerated. Because of the existence of communication between adjacent latex vessels laticiferous layers not opened by the tapping operation can in the long run have influence on the latex yield. Latex in the leaves and secondary and tertiary lateral branches is of no value in tapping.—*W. E. Cake.*

2411. BAILEY, IRVING W. **Phenomena of cell division in the cambium of arborescent gymnosperms and their cytological significance.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 283–285. July, 1919.—See Bot. Absts. 3, Entry 1932.

2412. BAILEY, I. W. **Histology of phloem.** [Rev. of MACDANIELS, L. H. **The histology of the phloem in certain woody angiosperms.** Amer. Jour. Bot. 5: 347–378. 1918. (See Bot. Absts. 1, Entry 578.)] Bot. Gaz. 67: 276. 1919.—The reviewer regards the work of the

author as tending to weaken the absoluteness of the doctrine of recapitulation, stating that "it has been a common morphological fallacy to assume that because the evolution of a selected structure progresses apparently in a given direction the sums of all structures (organisms) are moving in a similar direction."—*H. C. Cowles.*

2413. Beauverie, J. [Rev. of: Briquet, J. **L'appareil staminal des Composées, structure et fonctions de ses diverses parties. (Structure and function of staminal apparatus in Compositae.)** Bull. Soc. Vaudoise Sci. Nat. **51**: 208. 1917.] Rev. Gén. Bot. **31**: 205–207. 1919.

2414. Benedict, R. C. **The simplest fern in existence.** Amer. Fern Jour. **9**: 48–50. *3 pl., 7 fig.* 1919.—*Monogramme dareaecarpa* Hooker is described as the simplest fern in existence. It is a small epiphytic plant found growing among the mosses on the bark of trees. Each leaf has only one vein and one fruiting line, set in a groove along one side of the leaf.—A comparison is made with the four other species of the genus.—*F. C. Anderson.*

2415. Bhide, R. K. **Probable material for the study of the experimental evolution of Oryza sativa, var. plena, Prain.** Agric. Jour. India **14**: 494–499. 1919.—See Bot. Absts. 3, Entry 2088.

2416. Bos, J. Ritzema. **Eene eigenarrdige monstruositeit bij een aardbei. [A peculiar monstrosity in a strawberry.]** Tijdschr. Plantenz. **25**: 193–194. *5 pl., 7 fig.* 1919.—A strawberry fruit is described and pictured, two ovaries of which proliferated to form each a small but perfect flower, borne on a slender pedicel with a few small leaflets at its base on the fleshy receptacle.—*H. H. Whetzel.*

2417. Carroll, Franklin B. **The development of the chasmogamous and the cleistogamous flowers of Impatiens fulva.** Contrib. Univ. Pennsylvania Bot. Lab. **4**: 144–183. *Pl. 55–57.* 1919.—The author finds that chasmogamous flowers, which are pollinated by hummingbirds and bees, appear in late June and last till early October, and that cleistogamous flowers appear in early June and last through the summer on the lower short side of branches of many plants, under good conditions. Pseudocleistogamous flowers are morphologically chasmogamous buds self-fertilized at various stages. The seeds produced by the two kinds of flowers are the same in size. The morphology of the flower is discussed, with an account of the development of the pollen. A detailed embryologic study of the apparatus follows with a consideration of pollen tube development, fertilization and embryonic development.—*John W. Harshberger.*

2418. Chipplot, J. **Sur les cannaux secreteurs de quelques Gesneracées et en particulier de ceux de Monophyllaea Horsfieldii R. Br. [Secretory canals of the Gesneriaceae, particularly those of Monophyllaea Horsfieldii.]** Compt. Rend. Acad. Sci. Paris **168**: 525–527. 1919.—The following genera were examined to determine the presence and location of secretory canals: *Klugia, Gesnera, Centrosolenia, Rhytidophyllum, Tydoea, Aeschynanthus, Streplocarpus, Ramondia* and *Monophyllaea. Rhynchoglossum* was not examined. Canals were found only in the stems and leaves of *Klugia* and *Monophyllaea.*—In *Klugia Notoniana* the stele consists of a circle of woody bundles, with 5 to 7 medullary bundles. The canals occur either at the protoxylem points of the outer bundles or at some distance from the medullary bundles. Only the largest bundles are accompanied by canals. In the main vein of the leaf there are five vascular strands, accompanied by 3 canals, 2 of which are adjacent to primary xylem. In the secondary veins there is a single canal situated in the tissue adjoining three vascular strands. In the adult hypocotyl of *Monophyllaea Horsfieldii* the condition is similar to that just described. Here the canals accompany the larger bundles of the circle, occurring rarely with the medullary bundles. In the principal vein of the cotyledon the canals are also associated with the xylem of the larger bundles; the central strands never possess canals. In the lateral veins the lower (inferior) groups of bundles are often accompanied by canals; the upper (superior) do not possess them.—The canals contain an oily resin, yellow in color, and odorless.—*F. B. Wann.*

2419. CHURCH, A. H. **Androecium and gynoecium.** Jour. Botany 57: 220–223. 1919.—The spelling and etymology of these terms is discussed, and the variation in usage by different authors is noted. The first use of the terms was by J. ROEPER in Linnaea 1. 433, and the original spelling was *androeceum* and *gynoeceum*. Later in many texts the spelling of the latter term became *gynaeceum*. The author agrees with BOWER in preferring the form given in the title. He states that the Greek derivation does not signify the "female apartment" of the house, but the female place or part of the flower and has no reference to "women." However, "To return to the *-eum* of ROEPER, may be satisfying to the more pedantic; the attitude of BENTHAM (who used *-ium*) is good enough for any English botanist; but the use of *ae* instead of *oe*, is not only distinctly wrong but extremely foolish."—*K. M. Wiegand.*

2420. CHURCH, MARGARET B. **The development and structure of the bulb in Cooperia Drummondii.** Bull. Torrey Bot. Club 46: 337–362. *Pl. 14–16, fig. 1–9.* 1919.—The germination and development of the seedlings of *Cooperia* are described with special reference to the formation of the bulb, which is set deep down into the ground by root-contraction. The mature bulb is described, as well as the formation of offsets, flower scapes and leaves.—*P. A. Munz.*

2421. COLLINS, G. N. **Structure of the maize ear as indicated in Zea-Euchlaena hybrids.** Jour. Agric. Res. 17: 127–135. *Pl. 16–18.* 1919.—Hybrids of maize (*Zea mays*) and its near relative, *Euchlaena mexicana*, offer a partial solution of the puzzling morphology of the pistillate inflorescence of the former. These hybrid plants exhibit intermediate stages between the simple spike of *Euchlaena* and the complex ear of *Zea*. In the parent forms each "metamer" of inflorescence bears a morphological unit of spikelets (either staminate or pistillate; either, two, one sessile and one pedicelled, or one, the second suppressed) which is designated by a new term, *alicole*. There is evident in a series of hybrid forms the increasing of alicoles through the twisting of the axis of a simple spike; the reappearance of suppressed spikelets; the increase, crowding, and association in pairs of alicoles, forming the typical ear. Some structural features of the latter can be better explained by the theories of fasciation, or "reduced branches," for which, however, these forms offer no supporting evidence. [See Bot. Absts. 3, Entry 1472.]—*A. J. Eames.*

2422. COULTER, J. M. **Stomata.** [Rev. of: REHFOUS, LAURENT. **Étude sur les stomates. (On stomata.)** Univ. Genève Inst. Bot. IX. No. 6. *110 p. 125 fig.* 1917.] Bot. Gaz. 67: 274. 1919.

2423. COULTER, J. M. **Nature of monocotyledonous leaves.** [Rev. of: ARBER, AGNES. **The phyllode theory of the monocotyledonous leaf, with special reference to anatomical evidence.** Ann. Botany 32: 465–501. *32 fig.* 1918. (See Bot. Absts. 1, Entry 1324.)] Bot. Gaz. 7 273–274. 1919.

2424. COULTER, J. M. **Embryo sac and fertilization in Oenothera.** [Rev. of: ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenot era.** Ann. Botany 32: 279–317. *7 pl., 14 fig.* 1918. (See Bot. Absts. 1, Entry 482, 979, 980.)] Bot. Gaz. 67: 275–276. 1919.

2425. COULTER, J. M. **Angiosperm wood lacking vessels.** [Rev. of: BAILEY, I. W., AND W. P. THOMPSON. **Additional notes upon the angiosperms Tetracentron, Trochodendron, and Drimys, in which vessels are absent from the wood.** Ann. Botany 32: 503–512. *16 pl., 9 fig.* 1918. (See Bot. Absts. 1, Entries 1588, 1602.)] Bot. Gaz. 67: 279. 1919.

2426. COULTER, J. M. **Apogamy in Camptosorus.** [Rev. of: BROWN, ELIZABETH DOROTHY WUIST. **Apogamy in Camptosorus rhizophyllus.** Bull. Torr. Bot. Club 46: 27–30. *2 pl.* 1919. (See Bot. Absts. 2, Entry 285.)] Bot. Gaz. 67: 280. 1919.

2427. COULTER, J. M. **Seedling anatomy.** [Rev. of: HOLDEN, H. S., AND DOROTHY BEXON. **Observations on the anatomy of teratological seedlings. I. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Botany 32: 513–530. *17 fig.* 1918. (See Bot. Absts. 1, Entry 1330.)] Bot. Gaz. 67: 280. 1919.

2428. den Doop, J. E. A. **Ranunculus acris Linné met teruggeslagen kelkbladen. [Ranunculus acris L. with reflexed sepals.]** Nederland. Kruidkundig. Arch. **1918**: 155–157. May, 1919.—The rather frequent occurrence of specimens with this character, as noted by other botanists, is recorded in various parts of Holland.—*J. A. Nieuwland.*

2429. Dixon, H. H. **Mahogany and the recognition of some of the different kinds by their microscopic characters.** Notes Bot. School Trinity Coll. Dublin **3**: 3–58. *23 pl.* 1919.—See Bot. Absts. 3, Entry 2017.

2430. Ensign, M. R. **Venation and senescence of polyembryonic citrus plants.** Amer. Jour. Bot. **6**: 311–329. *6 fig.* 1919.—See Bot. Absts. 4, Entry 1555.

2431. Ensign, M. R. **A staining method for vascular tissue.** Phytopath. **9**: 180. 1919. —Use hot water followed by nitric acid, dehydrate, stain in methylene blue, clear and mount in castor oil.—*R. E. Vaughn.*

2432. Gertz, Otto. **Panachering hos Mercurialis perennis L. En morfologisk, anatomisk, och mikrokemisk studie. [Variegation in Mercurialis perennis L.]** [Swedish with German résumé.] Bot. Notiser **1919**: 153–164. *22 fig.* 1919.—See Bot. Absts. 3, Entry 2126; 4, Entry 1557.

2433. Guerin, Paul. **L'Urera Humblotii H. Baillon et ses affinites. [Urera Humboltti and its affinities.]** Compt. Rend. Acad. Sci. Paris **168**: 517–519. 1919.—See Bot. Absts. 4, Entry 1728.

2434. Henderson, Margaret W. **A comparative study of the structure and saprophytism of the Pyrolaceae and Monotropaceae with reference to their derivation from the Ericaceae.** Contrib. Univ. Pennsylvania Bot. Lab. **5**: 42–109. *10 fig.* 1919.—Following a general introduction and historical account of previous investigations, the writer presents the results of her work on morphology and histology of a series of plants, studying the underground root and stem systems, the epidermis, the leaves, the inflorescence and the flowers and flower parts, as well as the fruit and seeds. The conclusions reached are that all of the supposed differences between the Ericaceae and the Pyrolaceae break down except that the ovary is completely five-celled in the Ericaceae and incompletely five-celled in the Pyrolaceae. The distinction is so slight that it seems unreasonable to use it as a basis for separating the two families. The only distinction that holds between the Pyrolaceae and the Monotropaceae is the absence of chlorophyll in the latter; hence these families differ from the Ericaceae only in their gradually increasing saprophytism.—*John W. Harshberger.*

2435. Lohr, P. J. **Untersuchungen über die Blattanatomie von Alpen- und Ebenenpflanzen. [Investigations on the leaf anatomy of alpine and prairie plants.]** Recueil Trav. Bot. Néerland. **16**: 1–62. *Fig. 1a–4b (8), tab. 12.* 1919.—See Bot. Absts. 4, Entry 240.

2436. Matouschek. [Rev. of: Mihalusz, V. **A gyermekláncfü tökoksányán rendellenesen megjelenö levélke. (Abnormal leaf formation on the floral stem of Taraxacum officinale.)** Bot. Közlemények **16**: 109–115. *5 fig.* 1917.] Zeitschr. Pflanzenkrankh. **29**: 52. 1919.—Author describes purely teratological phenomenon in *Taraxacum;* i.e., foliation of floral stem. —*H. T. Güssow.*

2437. McLean, R. C. **Studies in the ecology of tropical rain-forest; with special reference to the forests of south Brazil. I. Humidity.** Jour. Ecology **7**: 5–54. *1 pl., 21 fig.* 1919.—See Bot. Absts. 4, Entry 196.

2438. McMurray, Nell. **Stamens of meadow parsnip.** Amer. Bot. **25**: 69. 1919.

2439. Melvill, J. Cosmo. **Teratology in Papaver orientale.** Jour. Botany **57**: 226. 1919. —A brief note on the occurrence of a gamopetalous corolla on this plant.—*K. M. Wiegand.*

2440. Namakawa, Isawo. **Über das Öffnen der Antheren bei einigen Solanaceen. [Dehiscence of the anthers of some Solanaceae.]** Bot. Mag. Tôkyô **33**: 62–69. *7 fig.* 1919.—The dehiscence mechanisms are described in some detail for the following: *Lycopersicum escu-*

lentum, *Capsicum annuum*, *Schizanthus pinnatus*, *Solanum nigrum*, *S. Dulcamara*, *S. tuberosum*, *S. melongena*, *Petunia violacea*, *Nicotiana alata var. grandiflora*, and *Physalis alkakengii*. Though there is some variation in details, the general mechanism is as follows: The epidermis of the suture is underlain by a special disjunctive tissue from 1 to 7 layers thick. The first changes in these cells are accompanied by an accumulation of oxalic acid and calcium oxalate. The acid then attacks the protoplasm and destroys it. It converts the walls into hemicellulose and finally dissolves them entirely. These changes occur before the flower opens. Actual anthesis is brought about in one of three ways: (a) solution of the middle lamellae of the sutural epidermis, (b) solution of the entire wall, or (c) mechanical rupture of the epidermis through the hygroscopic action of a fibrous layer of cells in the anther wall —*Leonas L. Burlingame.*

2441. PHILLIPS, EDWIN PERCY. **A note on the pollination of Cyanella capensis Linn.** South African Jour. Sci. **15**: 500–502. 1919.—In *Cyanella capensis* the bud is at first vertical, then becomes horizontal and finally pendulous. In the latter stage it expands. The flower is protandrous, and the six stamens are arranged in three groups of 3, 2, and 1. The tip of the style curves upwards and the stigmas lie near the apices of the lateral stamens in such a position as to favor self pollination. As the flower closes the posterior stamens exude a fluid laden with pollen grains, which ensures pollination if other methods fail. The flower is also evidently adapted for cross-pollination by insects, but this has not been verified.—*E. P. Phillips.*

2442. RECORD, SAMUEL J. **Storied or tier-like structure of certain dicotyledonous woods.** Bull. Torrey Bot. Club **46**: 253–273. 1919.—Tier-like arrangement of the secondary elements is characteristic of many dicotyledonous woods and is seen in longitudinal section, particularly the tangential, as bands or striations called "ripple marks." In such woods the cambium cells are in tangential as well as in radial seriation but it is often only in the thicker stems that this storied structure is evident and it may or may not extend to all the secondary elements: rays, vessel-segments, tracheids, wood fibers, and wood parenchyma strands. The storied structure is found in the secondary phloem also. "Ripple marks" have been reported for many woods of many families, particularly tropical ones, and are often constant enough for use as diagnostic characters. A table is given for many woods indicating what elements are storied, how regular the lines are, how visible, and giving tier height and measurements. —*P. A. Munz.*

2443. ROMELL, LARS-GUNNAR. **Anatomiska Egendomligheter Vid en Naturympning av Gran På Tall. [Anatomical characteristics in a natural graft of spruce upon pine.]** Meddel. Statens Skogsförsökanst. **16**: 61–66. *2 fig.* 1919.—A live spruce branch (*Picea excelsa*) was found growing on a 56-year old pine (*Pinus sylvestris*) in the province of Östergötland, southern Sweden. Investigations showed that the branch had lived without communication with the mother spruce tree for at least 14 years. Microscopic examinations show the union to be incomplete in places, but in other places it is so perfect that the exact boundary line between spruce and pine cells is not distinguishable. Morphologically the cells of the two species retain their original characteristics, but physiologically they function harmoniously as parts of a single organism.—*G. A. Pearson.*

2444. RUSSELL, ALICE M. **A comparative study of Floerkea proserpinacoides and allies.** Contrib. Univ. Pennsylvania Bot. Lab. **4**: 401–418. *Pl. 91–92.* 1919.—Two plants were studied microscopically and macroscopically, as representing each of the two genera of the family Limnanthaceae, viz. *Floerkea proserpinacoides* and *Limnanthes Douglasii.* The root, stem, leaf, flower and fruit in their anatomical features show a striking similarity in both, *Floerkea* indicating by its reduced members that it is a form derived from *Limnanthes. Limnanthes* is a western plant, *Floerkea* is found in the east and west. Various species of *Limnanthes* represent transition types which range from large pentamerous types through smaller tetramerous species to those with trimerous flowers characteristic of the genus *Floerkea.* Since the genus *Floerkea* overlaps the distribution areas of pentamerous and tetramerous forms,

it is likely to be a type evolved from them and the two genera might be included in the same genus; although the author believes that Robert Brown's separation of them is correct.—*John W. Harshberger.*

2445. Souèges, R. **Les premières divisions de l'oeuf et les differenciations du suspenseur chez le Capsella Bursa-pastoris Moench. [The first divisions of the egg and the differentiations of the suspensor in Capsella Bursa-pastoris Moench.]** Ann. Sci. Nat. Bot. **X, 1**: 1–28. 1919. —The first division of the egg was found to give an apical and a basal cell, separated by wall at right angles to length of pro-embryo (horizontal); next mitoses led to horizontal wall across basal cell and vertical wall in apical cell, producing 4-celled stage of pro-embryo. Author points out that subsequent history of 2 lower cells of this stage has not been well known, and he made a cell lineage study on these two lower cells. The lower one of the 2 gave rise to a vesicular basal cell and 2 cells of filamentous part of suspensor; the second (intermediate cell of four-celled pro-embryo), by a horizontal division wall gave 2 cells, and later by similarly redividing made progeny of intermediate cell 4; a total of 6 cells made up filamentous part of suspensor at this stage. Last phase in development of suspensor is that which leads to hypophysis: of 6 cells just mentioned, 4 basal ones made part of adult suspensor and divided no further; terminal 2 divided transversely once, making a total of 8 for filamentous portion of complete suspensor; the terminal cell became hypophysis. Typically, then, of cells present at 4-celled stage, intermediate (second from base) gave rise to 6 distal cells of suspensor; and basal cell of 4 led to 2 cells of suspensor and vesicular cell at base of pro-embryo. Some exceptional pro-embryos discussed. One seemed due to an additional direct (amitotic) division in vesicular cell.—*James P. Kelly.*

2446. Steckbeck, D. Walter. **The comparative histology and irritability of sensitive plants.** Contrib. Univ. Pennsylvania Bot. Lab. **4**: 185–230. *Pl. 58–65.* 1919.

2447. Steil, W. N. **Secondary prothallia of Nephrodium hirtipes HK.** Trans. Amer. Microsc. Soc. **38**: 229–234. *Pl. 25–26.* 1919.—Culture medium used was sphagnum saturated with Knop's solution placed in small Stender dishes and thoroughly sterilized. Healthy prothallia were placed on this medium and exposed to subdued light for two weeks. Short filaments one cell thick were produced from the margins and both surfaces of the prothallia. The cultures were then placed in a Wardian case under favorable light conditions. The filaments broadened out and became heart shaped, and when cut off became independent prothallia and produced embryos apogamously. Several other species of ferns under the same treatment produced prothallia; but only in the case of *Nephrodium* were embryos produced apogamously.—*S. H. Essary.*

2448. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. **57**: 125–126. 143–145. *Fig. 10–12.* 1919.—See Bot. Absts. 3, Entry 1697.

2449. Styger, Jos. **Beiträge zur Anatomie der Umbelliferenfrüchte. [Contributions on the anatomy of umbelliferous fruits.]** Schweiz. Apoth. Zeitg. **57**: 183–188. *Fig. 13–15.* 1919. —See Bot. Absts. 3, Entry 1698.

2450. Taylor, William Randolph. **On the production of new cell formations in plants.** Contrib. Univ. Pennsylvania Bot. Lab. **4**: 271–299. *Pl. 71–78.* 1919.—The author gives a summary of previous work done on injecting chemicals into plant tissues. He experimented with chestnut trees and various herbaceous plants by injecting into them distilled water, chloroform water, ammonia, lithium carbonate, copper sulphate and picric acid, noting the effect of the injection on the general growth of the plant and the tissue reactions. As a result of the experiments, he considers that all the elements of the normal stem are capable of extensive multiplication unless they have been modified by cuticularization, lignification or suberization. Cells that are collenchymatous are notwithstanding able to proliferate freely. From these proliferated areas there may be formed cambioid zones that give rise to cork, to

xylem, and possibly to phloem. The initial multiplication may be started by mechanical or chemical means. The chemical irritation, if it suffices to cause tissue destruction, may have an ultimate effect similar to mechanical irritation.—*John W. Harshberger.*

2451. Tison, A. **Sur le suspenseur du Trapa natans L. [On the suspensor of Trapa natans L.]** Rev. Gén. Bot. 31: 219–228. *1 pl., 5 fig.* 1919.—The suspensor cells in the proembryo of *Trapa natans* enlarge enormously and push the embryo proper to the base of the embryo sac, which has no endosperm. About the base of the embryo the suspensor forms a circular outgrowth; on one side this produces a tongue-like process which establishes intimate union with the nucellar tissue of the chalaza and acts for some time as an absorbing organ. Later the embryo grows and resorbs the large suspensor almost completely.—*L. W. Sharp.*

2452. Turrill, W. B. **Female flowers in Plantago lanceolata.** Jour. Botany 57: 196. 1919.—A brief note on the occurrence of several plants in the Kew Gardens with shrivelled and sterile anthers. These are compared with others with aborted stamens described in the Botanical Bulletin (Botanical Gazette) 1: 45. 1876.—*K. M. Wiegand.*

2453. Van Wisselingh, C. **Bijdragen tot de Kennis van de zaadhuid. Derde bijdrage: Over de zaadhuid der Papaveraceen en Fumariaceen. [Contributions to a knowledge of seed-coats. Third contribution: On the seed coats of the Papaveraceae and Fumariaceae.]** Pharm. Weekblad 56: 849–865. *1 pl., 5 fig.* 1919.—The author found that in the seeds of the different species of Papaveraceae and Fumariaceae under examination the innermost integument and the nucellus are separated by a cuticle, which starts at the site of the embryo. The two inner cuticles are therefore no new formations.—In the ripe seeds these inner cuticles are still present and are still further developed, while the cuticle which covers the epidermis of the seed outside has become weaker and gives no longer reactions characteristic for cork-tissues and cuticles. *Sanguinaria* is an exception to this rule, since in the ripe seeds the cuticle between the integuments has disappeared. The inner cuticles in the ripe seeds indicate the borders of the integuments. In the ripe seeds cork-tissue has developed in the chalaza which is connected with the inner cuticle. This cuticle together with the cork-tissue form in the ripe seeds a coating around the endosperm and the embryo, which is only slightly permeable to different substances.—An exhaustive review of the literature on this subject is given. [See also Bot. Absts. 3, Entry 2809.]—*H. Engelhardt.*

2454. Van Wisselingh, C. **Bijdragen tot de kennis van de zaadhuid. Vierde bijdrage: Over de zaadhuid der Cruciferen. [Contributions to a knowledge of seed-coats. Fourth contribution: On the seed-coats of the Cruciferae.]** Pharm. Weekblad 56: 1246–1271. *Pl. 2, fig. 13.* 1919.—See Bot. Absts. 3, Entries 2453, 2809.

2455. Waldron, Ralph Augustus. **The peanut (Arachis hypogaea) its history, histology, physiology and utility.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 301–338. *Pl. 79–80.* 1919. —See Bot. Absts. 1, Entry 999; 4, Entry 139.

2456. Weatherwax, Paul. **The ancestry of maize—a reply to criticism.** Bull. Torrey Bot. Club 46: 275–278. 1919.—See Bot. Absts. 3, Entry 1045.

2457. Weingart, W. **Kleine Mitteilungen. [Minor contributions.]** Monatsschr. Kakteenkunde 29: 18–19. 1919.—See Bot. Absts. 3, Entry 3028, also 3029.

2458. Youngken, Heber Wilkinson. **The comparative morphology, taxonomy, and distribution of the Myricaceae of the Eastern United States.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 339–400. *Pl. 81–90.* 1919.—There are five good species of Myricaceae and a hybrid between two of these species along the eastern seaboard of the United States. The evergreen, *Myrica cerifera*, extends northward as far as Tuckahoe River, New Jersey. *Myrica carolinensis* of wide distribution along the coastal plain is deciduous. The hybrid between these two species (*Myrica Macfarlanei*) has leaves which are intermediate in duration, shape, thick-

ness and coloration between the parents.—*Comptonia asplenifolia*, from Nova Scotia to Tennessee, is strictly deciduous. *Myrica Gale*, a deciduous species, is distributed through northern regions, while *Myrica inodora* is evergreen. Seedlings are here described for the first time and their comparative morphology and that of the adult plants are traced. The author finds that the characteristic root-tubercles are due to *Actinomyces myricarum*, first described as the causal organism by himself. Exact phenological records have been kept, as to the maturation of the floral parts and the period of blossoming in April and May. Other details with a list of synonyms and a bibliography are given.—*John W. Harshberger*.

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

2459. Gardner, Nathaniel Lyon. **New Pacific Coast marine Algae, IV.** Univ. California Publ. Bot. 6: 487–496. *Pl. 42*. Jan. 4, 1919.—The following new species, forms, or combinations are proposed by Setchell and Gardner: *Anabaena propinqua*, *Ulothrix pseudoflacca* f. *maxima*, *Rhizoclonium lubricum*, *Hormaiscia sphaerulifera*, *H. vancouveriana* (Tilden) and *H. grandis* (Kylin). The following new species is proposed by the author separately, viz., *Codium Setchellii*.—*W. A. Setchell*.

2460. Gee, N. G. **A beginning of the study of the flora and fauna of Foochow and vicinity.** Jour. Roy. Asiatic Soc. North-China Branch 50: 170–184. 1919.—Contains lists of fresh-water algae, diatoms, and fungi.—*E. D. Merrill*.

2461. Naumann, Einar. **Über das Nachweisen gewisser Gallertstrukturen bei Algen mit gewöhnlichen Farbstiften. [Demonstration of gelatinous structures in algae with ordinary crayons.]** Zeitschr. Wiss. Mikrosk. 35: 243–244. 1919.

2462. Skvortzow, B. W. **Notes on the agriculture, botany and the zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11*. 1919.—This article consists of 31 chapters, long and short, and is a potpourri, as the title indicates. The botanical subjects discussed are dye plants; the fresh-water algae of southern China; Manchurian wheat; medicinal plants; growth of weeds and algae; Shanghai fresh-water algae; the use of *Nostoc* as food; bibliography of the algae of China; wild vegetables of Manchuria; dimensions of trees in Manchurian forests; the little known and new oil plants in Manchuria; the cultivated water plants in China; the flowers of Manchurian wild apricot; Kaoliang, barley and maize; a list of plants growing at Foochow; the use of *Equisetum* in China; on new Flagellata from Manchuria. In the last chapter about 40 species and varieties of flagellates are described as new, many of which are figured.—*E. D. Merrill*.

2463. West, George. **Amphora inflexa, a rare British diatom.** Jour. Quekett Microsc. Club II, 14: 35–40. *Pl. 2*. 1919.

2464. Yendo, Kichisaburo. **The germination and development of some marine algae. I.** Bot. Mag. Tôkyô 33: 73–93. *1 pl., 2 fig.* 1919.—*Porphyra leucosticta* var. *suborbiculata* and *P. linearis* are rock-inhabiting species abundant on the shores of Oshoro Cove near the Marine Laboratory of the Hokkaido Imperial University. To study them the author had built a sloping concrete block on a reef where the algae grew abundantly. The block was 4 feet high, terraced 3 inches wide every foot, and inclined about 45°. The first spores were found in late October attached to the block and to the 60 stones set into the terraces. Repeated towings with fine nets failed to reveal any spores in the water. The development of these spores into mature fronds was followed and the current account of carpospore formation confirmed. In April following, fronds with mature carpospores were transferred to the laboratory and cultivated in beakers. The water was kept at a temperature of 6–14°C. and the cultures were carried on in a well-lighted room but not in direct light. The carpospores germinated in the second week. In about 5 weeks mature branched filaments were produced. Certain

cells enlarged and formed gametes. The female were laterally biciliate and measured about 1.5–2μ by 3–3.5μ. The male were motile but the cilia were not observed. They measure about 1 by 1.5μ. Actual fusion was not observed nor was the fate of the oospore determined. Circumstantial evidence is offered to support the presumption that they and not the carpospores are the spores found on the rocks in October and which give rise to the ordinary fronds of the plant. Further particulars are promised in a second paper.—*Leonas L. Burlingame.*

2465. Zimmermann, C. **IX Contribuição para o estudo das diatomaceas dos Estados Unidos do Brazil. [Ninth list of Brazilian diatoms.]** Broteria Ser. Bot. 17: 5–16. 1919.—The article continues a series begun in 1913. Forty-one species and six varieties, none new, are listed without description, but with copious references to literature and brief citations of localities. —*Edward B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

2466. Andrews, A. LeRoy. [Rev. of: Hesselbo, Aug. **The Bryophyta of Iceland.** In: Rosenvinge, L. K., and Eug. Warming. The botany of Iceland 1: 395–677. *39 fig.* 1918. (See Bot. Absts. 1, Entries 470, 1040, 1048.)] Bryologist 22: 4–5. 1919.—The reviewer points out the care with which the author worked, but notes the lack of an adequate discussion of the relation between the flora and the geologic substrata, and corrects certain erroneous statements in distribution.—*Edward B. Chamberlain.*

2467. Andrews, A. LeRoy. **Notes on North American Sphagnum—VIII.** Bryologist 22: 45–49. 1919.—The author continues from the seventh number of this series (Bryologist 20: 84–89. 1917) an account of the characters, ranges and specific value of the species of the group *Cuspidata.* The following are among the conclusions reached: *S. tenellum* Pers. (not [Schimp.] Klinggr.) is the correct name for *S. mollusucum* Bruch; *S. cuspidatum* Ehrh., is closely related to, but not a form of, *S. recurvum* (Beauv.) Russ. and Warnst, and many artificial species belong here; *S. cuspidatum* var. *Torreyi* (Sull.) Braithw., is connected with the typical form of the species by too many forms to rank as more than a variety; *S. cuspidatum* var. *serrulatum* Schlieph., is an aquatic variant of more than formal value. At the close of the paper the author notes the occurrence of *S. Aongstroemii* Hartm. at Cape Nome, Alaska, the second record for the American mainland.—*Edward B. Chamberlain.*

2468. Evans, Alexander W. **Notes on North American hepaticae—VIII.** Bryologist 22: 54–73. *2 pl., 15 fig.* 1919.—Author discusses in detail and figures *Nardia fossombronioides* (Aust.) Lindb., *N. subelliptica* Lindb., and *N. rubra* (Gottsche) Evans, comb. nov., this species including Pacific Coast material previously called *N. crenulata* (Sm.) Lindb.; he gives briefer discussions of *Corsinia coriandrina* (Spreng.) Lindb., *Petalophyllum Ralfsii* (Wils.) Nees & Gottsche, and *Leptocolea cardiocarpa* (Mont.) Evans, all new to the United States flora; he corrects previous reports for *Sauteria alipina* Nees from the Gaspé Pensinula (referred to *Clevea hyalina* by error), notes that Alaskan material referred to *Grimaldia fragrans* is really *G. pilosa* (Hornem.) Lindb., that *Plagiochasma Muenchianum* Steph. is a synonym of *P. crenulatum* Gottsche, and that *Porella Cordaeana* (Hueben.) Evans, comb. nov., is the correct name for *P. rivularis* (Nees) Trevis. Two short lists of recently reported additions to the hepatic flora of Florida and Alaska, respectively, are included in the paper.—*Edward B. Chamberlain.*

2469. Burnham, Stewart H. **Hepaticae of the Lake George flora.** Bryologist 22: 33–37. 1919.—This is an annotated list of 64 species from the vicinity of Lake George, New York. Previous records and collections have been reviewed —*Edward B. Chamberlain.*

2470. Chamberlain, Edward B. **Anacamptodon splachnoides var. Tayloriae in Missouri.** Bryologist 22: 16. 1919.—The range of the variety is extended from Georgia to Missouri.—*Edward B. Chamberlain.*

2471. Durand, Elias J. **Encalypta laciniata in central New York.** Bryologist 22: 13. 1919 —The occurrence of this moss, associated with other northern types, is noted from several localities about Ithaca.—*Edward B. Chamberlain.*

2472 Grout, A. J. **Moss notes.—II. Two pogonatums.** Bryologist 22: 37–38. *1 fig.* 1919.—The author contrasts the distinguishing characters of *Pogonatum brevicaule* and *P. brachyphyllum*, illustrating them with a small cut.—*Edward B. Chamberlain.*

2473. Haynes, Caroline C. **List of French hepaticae collected by Major George H. Conklin, M. R. C.** Bryologist 22: 27. *Pl. 1.* 1919.—The author lists twelve species, all from the vicinity of Vichy. The plate is a portrait of Major Conklin.—*Alexander W. Evans.*

2474. Levy, Daisy J. **Preliminary list of mosses collected in the neighborhood of Hulett's Landing, Lake George, N. Y.** Bryologist 22: 23–26. 1919.—The author lists 159 species.—*Alexander W. Evans.*

2475. Lowe, Rachel L. **Collecting in Arkansas.** Bryologist. 22: 14–15. 1919.—The author lists 31 species of mosses from Hot Springs, Arkansas, and gives a brief account of the localities.—*Edward B. Chamberlain.*

2476. Lowe, Rachel L. **Collecting in Oklahoma.** Bryologist 22: 21–22. 1919.—Twenty-seven species of mosses are recorded from the vicinity of Ada, Oklahoma, with a brief account of the localities.—*Edward B. Chamberlain.*

2477. Luisier, A. **Les Mousses de Madère. [The mosses of Madeira].** Broteria 17: 28–48. 1919.—The present paper is the fourth of the series and covers the genera *Cinclidotus* to *Amphidium* (in part). No new forms are described; *Grimmia azorica* Card., is reduced to a subspecies of *G. trichophylla* Grev.; the author quotes descriptions from the less accessible books and appends special discussions of *Crossidium squamigerum*, *Tortula perlimbata*, *T. marginata*, *Anoectangium angustifolium*, and *Amphidium curvipes*. [See Bot. Absts. 1, Entry 757; also next following Entry, 2478.]—*Edward B. Chamberlain.*

2478. Luisier, A. **Les Mousses de Madère. [The mosses of Madeira.]** Broteria: Ser. Bot. 17: 49–66. *Pl. 1.* 1919.—This article is a continuation, without separate title, of a similar one published in the preceding issue of Broteria, and is the fifth of the series. The genera *Orthotrichum* and *Ulota* and the families *Funariaceae* and *Bryaceae* (in part) are included here. No new forms are described, though the accompanying plate figures plants described in the previous part. The author gives critical discussions in the case of *Ulota calvescens* Wils., *Funaria Fritzei* Geheeb, *Haplodontium Notarisii* (Mitt). Broth., *Pohlia proligera* Lindb. var. *tenella* Schiffn., and *Brachymenium philonotula* (Hampe) Broth. [See also next preceding Entry, 2477.]—*Edward B. Chamberlain.*

2479. Rapp, S. **A list of mosses from Sanford, Florida.** Bryologist 22: 50–54. 1919.—This is a list of 137 species or varieties of mosses, collected within ten miles of Sanford; there are no notes, but the author prefaces the list with some general remarks on the region and the habitats. Two new combinations are published, as follows: *Homalotheciella subcapillata* var. *fabronifolia* (Grout) E. G. Britton, and *Isopterygium micans* var. *fulvum* (Hook.) E. G. Britton.—*Edward B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. Olive, *Editor*

2480. Anonymous. **Reconocimiento de las setas. [Recognition of mushrooms.]** Informacion Agric. [Madrid] 9: 85–86. 1919.—General characters of poisonous and dangerous mushrooms are outlined.—*John A. Stevenson.*

2481. Anonymous [B. O. Dodge]. **Index to American mycological literature.** Mycologia 11: 227–230. 1919.

2482. Brick, C. **Die Schwarzfleckenkrankheiten der Tomatenfrüchte durch Phoma destructive Plowr. [Black-spot disease of tomato fruits caused by Phoma destructiva.]** Zeitschr. Pflanzenkrh. 29: 20–26. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2578.

2483. Doidge, E. M. **The diagnostic characters of some superficial fungi.** South African Jour. Sci. 15: 364–368. 1919.—The group *Hemisphaeriales* as defined by Theissen is divided into 3 families, the *Microthyriaceae*, *Hemisphaeriaceae* and the *Trichopeltaceae*. The structure of the thyriothecia is the basis of division into families, and spore and mycelial characters are used as generic distinction. *Meliola peltata*, a fungus occurring on *Podocarpus* sp., forms a compact disc which recalls the vegetative structure of the *Trichopeltaceae;* another form of exceptional interest is the recently described genus *Meliolaster*, which resembles the genus *Meliola* except in the form of the thyriothecium.—*E. M. Doidge.*

2484. Doidge, E. M. **South African Perisporiaceae. II. Revisional notes.** Trans. Roy. Soc. South Africa 7: 193–197. *3 fig.* 1919.—The nomenclature of certain species described in a previous paper (Trans. Roy. Soc. of South Africa 5: 713–750. Plates 57–66. 1917) is revised on evidence obtained from examination of fresh collections. The fungus described as *Meliola manca* Ell. & Mart. is *Meliola puiggarii* Speg. *M. torta* is redescribed, and two new species, *M. scabra* and *Perisporina melioliicola* are described.—*E. M. Doidge.*

2485. Fitzpatrick, Harry Morton. **Rostronitschkia, a new genus of Pyrenomycetes.** Mycologia 11: 163–167. *11 pl.* 1919.—A fungus parasitic on the leaves of *Gesneria albiflora* in Porto Rico and Jamaica is discussed. This fungus is a member of the family Cucurbitariaceae of the Sphaeriales and possesses characters not found in related fungi of the genera *Nitschkia*, *Eutype* and *Coelosphaeria*. It is considered as the type of a new genus, *Rostronitschkia*, and as a new species *R. nervincola*. *Nitschkia nervincola* Rehm in litt. is cited as a synonym.—*H. R. Rosen.*

2486. Garrett, A. O. **Smuts and rusts of Utah. III.** Mycologia 11: 202–215. 1919.—Five smuts and fifty-nine rusts are listed.—*H. R. Rosen.*

2487. Grove, W. B. **Mycological notes.—IV.** Jour. Botany 57: 206–210. 1919.—I. *Phyllosticta* and *Phleospora*. The species assigned to the form genus *Phleospora* have long been the subject of controversy as to whether there is a true pycnidium. The difficulty is frequently due to the presence of the pycnidium in early stages and its absence in later stages of the same plants. Spores produced by the same hymenium may in certain cases differ as to the pycnidia produced. Therefore the same little black dot on a leaf may be placed in *Phyllosticta, Phleospora, Septogloeum,* or even in *Leptothyrium* or *Septoria*, depending on its age at the moment of observation. *Phleospora Oxyacanthae* Wallr. when closely examined shows intermixed with pycnidia which accord with the description of that species others indistinguishable from those of *Phyllosticta monogyna* Allesch. except in having slightly smaller spores. It is as though the same pycnidium at first produced *Phyllosticta* spores and afterward began to produce the larger *Phleospora* spores which burst the pycnidium open. All the steps between can be traced in sections. But the spores of the *Phyllosticta* stage vary continuously in size, as for instance in *P. monogyna*, which therefore is very possibly a later stage of *Phyllosticta crataegicola* Sacc. A great deal of the confusion in the Coelomycetes is due to the failure to recognize the variation in size, color and complexity of the spore in different stages of the same fungus. For instance, all *Diplodia* spores pass through the stages (1) hyaline and continuous (2) pale-brown and continuous (3) darker brown and septate, with often increase in size. In the first stage they have been called *Macrophoma*, in the second *Sphaeropsis*, and in the third *Diplodia*. Thus Dr. Ellis' specimen of *Macrophoma Fraxini* gives also *Sphaeropsis* and *Diplodia* spores in the same pycnidia: and *Phoma pinastri* Lev., *Sphaeropsis Ellisii* Sacc., and *Diplodia Pinastri* Grove are all growth states of the same plant.—The condition

here is likened to the heterospory in various rusts. Other cases are given as follows: *Phleospora Aceris* Sacc. is accompanied by *Phyllosticta Platanoides* Sacc. which at an intermediate stage has been called *Leptothyrium Platanoides. Phleospora Ulmi* Wallr. is accompanied by an apparently unnamed *Phyllosticta. Septoria Podograriae* is frequently accompanied on the same spot by *Phyllosticta Aegopodii* Allesch. At one stage this has been placed in *Cylindrosporium.* All these fungi appear to develop later into species of *Mycosphaerella.* Klebahn showed that *Phleospora Ulmi* is the pycnidial stage of *Mycosphaerella Ulmi.* Jaap proved the same for *P. Oxycanthae* and *M. Oxycanthae. P. Aceris* is often accompanied by a form which is probably *M. septorioides* (Desm.). *Phyllosticta Aegopodii* and *Phleospora Podagrariae* are almost certainly *M. Aegopodii.* This is all held to show the closely knit relationship of the groups in the third volume of Saccardo's Sylloge and how necessary it is to have a term (Coelomycetes) to include them all. The futility of calling spores "sporulae" in one group and "conidia" in another is shown. Cultures are desirable to prove the above absolutely, but when these forms occupy a definite "spot" on the mycelium and the phenomena reoccur frequently, the result is practically equivalent to a pure culture.

II. *Sphaerulina intermixta* (B. & Br.) and its Allies. Material collected at Birmingham on *Rubus* and on *Rosa damascena* throws light on the relationship of *Sphaeria intermixta* Berkley & Broome, with hyaline spores, and *S. abbreviata* Cooke with "pale brown" spores in lineally aggregated perithecia. The evidence tends to show that these two species differ solely in the "arrangement of their perithecia (a difference which future observations may entirely remove), and that they probably constitute one species (*S. intermixta*) occurring indiscriminately on *Rosa* and *Rubus,* and having in addition on *Rubus* a var. *abbreviata* (Cooke)." Cook's statement that the spores were "pale brown when mature" was probably a slip of the pen. The older material on Rubus showed larger spores and increased septation. The younger less complete form is probably the *Metasphaeria sepincola* (Fckl.) Sacc. on *Rosa* and *Rubus,* and possibly the *Sphaeria sepincola* of Fries. The later 5–6 septate stage is probably *M. brachytheca* (B. & C.) Sacc. on *Rosa.* Material on *Rosa damascena* was in all respects like *Sphaerulina intermixta* except in the larger more septate spores. This could be only a later stage of this species. The fungus on *Rosa damascena* is here described as *S. intermixta* f. *valde-evoluta* f. nov. Incidentally it is interesting that just as Cook recorded his *S. abbreviata* as accompanied by *Hendersonia Rosae* (= H. Rubi?), so the fungus on *R. Damascena* was accompanied by what is usually called *Hendersonia Rosae,* though because of the presence of one or two longitudinal septae this latter material becomes technically a *Camarosporium* as many Hendersonias do. "In fact this increase of septation as the spores of Coelomycetes and Ascomycetes become older and longer is a very common phenomenon, though its occurrence and its fundamental influence on future taxonomy is only just beginning to be recognized."—*K. M. Wiegand.*

2488. HILTON, A. E. **Observations on capillitia of Mycetozoa.** Jour. Quekett Microsc. Club II, **14**: 5–12. 1919.—Gives observations on *Lamproderma columbinum, Arcyria, Lycogola epidendron, Stemonitis, Cribraria,* and *Dictydium.*—*Leva B. Walker.*

2489. KENDALL, A. I., A. D. DAY, A. W. WALKER, AND M. RYAN. **The fermentation reactions of certain streptococci. XLII. Studies in bacterial metabolism.** Jour. Infect. Diseases **25**: 189–206. 1919.—See Bot. Absts. 3, Entry 2851.

2490. LUIJK, A. VAN. **Fungi van Nederland. I. Geoglossaceae van Nederland.** [**Fungi of Holland. I. Geoglossaceae of Holland.**] Nederland. Kruidkundig Arch. **1918**: 111–144. *12 fig.* May, 1919.—Bibliography, keys, descriptions and indications of generic types of the Geoglossaceae of Holland with critical notes, references to published plates and citations of herbarium specimens. No new species mentioned.—*J. A. Nieuwland.*

2491. MURRILL, W. A. **Bahama fungi.** Mycologia 11: 222–223. 1919.—*Polyporus Bracei* sp. nov. is described. The type was collected at New Providence, Bahamas.—*H. R. Rosen.*

2492. Murrill, W. A. **A new species of Lentinus from Minnesota.** Mycologia 11: 223–224. 1919.—A flesh-colored *Lentinus* from Itasca Park, Minnesota, is described as a new species, *L. Freemanii.*—*H. R. Rosen.*

2493. Murrill, W. A. **Fungi from Ecuador.** Mycologia 11: 224. 1919.—28 species of fungi collected by J. N. Rose are listed.—*H. R. Rosen.*

2494. Murrill, W. A. **Queer fungous growths.** Mycologia 11: 225–226. 1919.—Simple and irregularly branched structures found in Texas, varying in color from a dark-avellaneous tint to a dirty-white, are described. Particles of sand are intimately mixed with fungous mycelium although the central core is free from sand and presents the structure of some vegetable matter.—*H R. Rosen.*

2495. Orton, C. R. **Notes on some polemoniaceous rusts.** Mycologia 11: 168–180. 1919.—Author presents a detailed study of type specimens representing some 20 odd described or named species or varieties of rusts occurring on Polemoniaceae. Of this number 4 valid species are recognized on these hosts and 1 species on a cruciferous plant. The valid species are *Allodus giliae* (Peck) Orton, (*Puccinia plumbaria* Peck), under which 16 different synonyms are listed, *Allodus Douglasii* (Ellis & Ev.) Orton, (*Puccinia Douglasii* Ellis and Ev.), with 3 synonyms, *Aecidium Polemonii* Peck, and *Puccinia Giliae* Hark. *Puccinia arabicola* Ell. & Ev., which had been confused with *P. plumbaria,* is considered as a distinct species and occurring on some crucifer, probably *Cardamine Douglasii* (Lam.) Britton, instead of occurring on some species of *Phlox.*—*H. R. Rosen.*

2496. Pole Evans, I. B., and A. M. Bottomley. **On the genera Diplocystis and Broomeia.** Trans. Roy. Soc. South Africa 7: 189–192. *Pl. 19–22.* 1919.—The genus *Diplocystis* has been regarded as monotypic, and only recorded from Cuba, Bahamas and the West Indies. A new species, *Diplocystis Junodii,* is described, collected in Portuguese East Africa. In both genera a number of individuals arise from a common stroma; in *Diplocystis* the stroma is rather thin and saucer-shaped; in *Broomeia* it is rather thick and somewhat columnar. Two species of *Broomeia, B. congregata* Berk and *B. ellipsospora* v. Höhn., have been recorded from South Africa, and a third, *B. guadaloupensis* Lev. from Guadaloupe.—*E. M. Doidge.*

2497. Rhoads, Arthur S. **The biology of Polyporus pargamenus Fries.** New York State Coll. Forestry Tech. Publ. 11. *197 p., 21 pl., 6 fig.* 1918.—*Polyporus pargamenus* Fries is one of the most common fungi causing sap-rot in nearly all dicotyledonous trees throughout its nearly cosmopolitan range. It is essentially a saprophytic organism but it frequently becomes a wound-parasite in fire-scarred trees in the hard-wood forests of the eastern United States.—Although the sporophores are subject to much variation, the various forms should be considered as one species. It is, however, distinct from *Polyporus abietinus* Fries. Spores are shed intermittently over long periods. The dried sporophores may revive and produce spores after desiccation for at least a year. Spores kept dry for 10 months did not lose their viability. Darkness is conducive to the most vigorous vegetative growth, but light is necessary for the production of sporophores and spores. Basidiospores germinate readily in both tap and distilled water as well as in many kinds of culture media. The short-lived primary mycelium regularly produces oidia which give rise to secondary mycelium. This secondary mycelium may break up soon into oidia or grow into the ordinary vegetative mycelium and eventually produce sporophores. Chlamydospores may form in the secondary mycelium.—Microscopic studies were made of the decay in 5 species of wood and macroscopic studies in 28 other species of wood. Minor variations in the decay of different woods by this fungus are dependent upon the dissimilar structure of the respective woods. Chemical studies of the decay show that the humic by-products vary, but they are similar to those produced by other wood-destroying fungi.—Forest sanitation is suggested as a means of control.—*L. H. Pennington.*

2498. Van der Bijl, Paul A. Observations on a fungus—Oephalosporium Sacchari Butler—which causes a red rot of sugar-cane stems. Union of South Africa Dept. Agric. Sci. Bull. 11. 1919.—See Bot. Absts. 3, Entry 2777.

2499. Waksman, Selman A. Studies in the metabolism of Actinomycetes. (II.) Jour. Bact. 4: 189–216. 1919.—See Bot. Absts. 3, Entry 2860 and 2883.

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

2500. Anonymous. [Rev. of: Henry, A. Woods and trees of Ireland. County Louth Archaeological Journal, 1914.] Jour. Ecol. 7: 105–106. 1919.

2501. Antevs, Ernst. Die Liassische Flora des Hörsandsteins. [Liassic flora of Hör sandstone.] Kgl. Svensk. Vetens.-Akad. Handl. 59: 1–71. *6 pl.* 1919.—This interesting flora partially made known from time to time in special papers by Nathorst, Halle and Antevs has attracted special interest as the assemblage containing the branched cycadophyte, *Wielandella,* widely known through Nathorst's admirable restoration. The deposits at Hör, long considered of Rhaetic or upper Triassic age and so treated in Wieland's cycad studies, are now referred to the Liassic or lower Jurassic. Their flora, as monographed by the present author, comprises 51 named species besides many fragments and seeds which remain unnamed. The Equisetales are abundant individually and number 5 species: There are 15 ferns representing the genera *Thaumatopteris, Woodwardites, Clathropteris, Dictyophyllum, Gutbiera, Adriania, Cladophlebis, Todites, Sagenopteris, Marattiopsis* and *Rhizomopteris.* It is suggested that *Lepidopteris* may be a surviving representative of the Pteridospermophyta. The Cycadophyta enumerated number 17 and include the genera *Cycadites, Nilsonia, Pterophyllum, Anomozamites, Wielandiella, Ctenopteris* and *Stenorrhachis.* The genus *Lomatopteris* is left as either a fern or cycadophyte. Seven Ginkgoales are recorded representing the genera *Ginkgo, Baiera* and *Czekanowskia.* The Coniferales number 5 and comprise the genera *Swedenborgia, Pityophyllum, Podozamites, Schizolepis* and *Conites.* The following 5 species are described as new: *Cycadites Blomqvisti, Pterophyllum intermedium, Stenorrhachis dubius, Schizolepis hörensis* and *Conites oblongus.—E. W. Berry.*

2502. Arber, A. The "Law of Loss" in evolution. Proc. Linn. Soc. London, 131: 70–78. 1919.—Discusses the non-reversibility of evolution and its bearing on plant phylogeny. The author considers that this is illustrated by the root-like organs of submerged plants like *Ceratophyllum* and certain Utricularias where these organs are not morphologically roots. Similar explanations are given for the leaves of Alismaceae and Pontederiaceae which are considered as phyllodes. The absence of interfascicular cambium in the monocotyledons is regarded as a case in point, as is the endosperm of the angiosperms, which is considered a new structure and not the morphological equivalent of the prothallial tissue of the lower plants. The morphology of the *Naias* flower and polystely of *Gunnera* are also considered as illustrations of this thesis.—*E. W. Berry.*

2503. Arber, E. A. N. Remarks on the organization of the cones of Williamsonia gigas (L & H). Ann. Botany 33: 173–179. *5 fig.* 1919.—Concludes that these Cycadophyte cones were probably monosporangiate. The female cone was of the familiar conical type, with bracts below and seeds and interseminal scales above. The male cone consisted of bracts, an urn-shaped axis (gonophore) with a partly united whorl of sporophylls, and lacked interseminal scales or any sterile infundibular organ.—*E. W. Berry.*

2504. Cantrill, T. C., and B. Smith. On a boring for coal at Winterbourne, Gloucestershire. Mem. Geol. Surv. Summary of Progress for 1918:-53–57. 1919.—List of Carboniferous plants found in the bore is given on page 56.

2505. CARPENTIER, A. **Notes d'excursions et remarques sur le Bassin houiller de la Basse Loire.** [**Notes on coal basin of Loire.**] Bull. Soc. Géol. France IV, 18:–235–247. *Pl. 3, 4.* 1919.—Contribution to Carboniferous flora of Loire basin in France. Enumerates fossil plants of Beaulieu, of which *Archaeocalamites radiatus, Calamites suckowi, Calamites ramosus, Stigmaria ficoides, Pecopteris aspera* and *Telangium sp.* have not hitherto been recorded from this locality. Records for the first time from St. Aubin de Luigne the following: *Calamites suckowi, Sphenophyllum tenerrimum, Pecopteris aspera* and *Diplothmema cf. selaginoides.* Also records plants from la Haie Longue, Sainte Barbe, Varades and Montrelais. The following new or little known forms from the Lower Carboniferous (Culm) are described and figured: *Sphenophyllum Davyi* Bureau, *Macrostachya Bureaui* n. sp., Lepidostrobus cf. *Lepidophloios laricinus* Sternb., Pteridosperm seeds, *Zeilleria moravica* Bureau, *Lagenospermum acutifolia* Bureau.—*E. W. Berry.*

2506. CARPENTIER, A. **Notes palaeophytologiques sur le Carbonifère du Bassin de la Basse-Loire.** [**Palaeophytological notes on the Carboniferous of the basin of the Basse-Loire.**] Rev. Gén. Bot. 31: 81–93. *1 pl.* 1919.—A record of observations on the Carboniferous flora of the basin of the Basse-Loire, based on specimens in the collections of the University of Angers and on new material. Among the forms noted are: *Sigillaria, Lyginodendron* and *Syringodendron;* the Pteridosperm fructifications *Sphenopteris Dubuissoni, S. tenuifolia Linkii, Neuropterocarpus ellipticus, Zeilleria moravica* and *Pterispermotheca* (nov. gen.); *Sphenopteris depauperata; Guilielmites umbonatus.* Some remarks on xerophytism in the Carboniferous are included.—*L. W. Sharp.*

2507. CARPENTIER, A. [Rev. of: SEWARD, A. C. **Antarctic fossil plants. British Museum of Natural History. (British Antarctic "Terra Nova" expedition, 1910.)** Nat. Hist. Repts., Geology 1: 1–49. *Pl. 1–8, maps A–C, fig. 1–6.* 1914.] Rev. Gén. Bot. 31: 350–352. 1919.

2508. CHAPMAN, F. **On the age of the Bairnsdale Gravels; with a note on the included fossil wood.** Proc. Roy. Soc. Victoria 31 (n. s.) : 166–175. *10 pl., 1 fig.* 1918.—Describes two species of petrified wood of *Eucalyptus* from Bruthen, Gippsland, Victoria, of supposed Pliocene age.—*E. W. Berry.*

2509. FRITEL, P. H. [Rev. of: COLANI, M. **Essai sur les flores tertiaires du Tonkin. (Tertiary floras of Tonkin.)** Bull. Serv. Geol. de l'Indo-Chine.] Rev. Gén. Bot. 31: 270–272. 1919.

2510. GUILLAUMIN, A. **Notes de Palaeobotanique Néo-Calédonienne.** [**New-Caledonian paleobotanical notes.**] Rev. Gén. Bot. 31: 273–276. *1 pl.* 1919.—The New Caledonian flora of the Permo-Trias had numerous ferns and conifers analogous to those of the Permian. No evidence for the presence of *Glossopteris* has yet been found, in spite of its abundance in New Zealand and other southern lands. In the collections of the Geological laboratory of the Faculty of Sciences in Paris are specimens of *Taeniopteris, Sphenopteris* and gymnosperm leaves from the Permian of New Caledonia, and *Araucarioxylon australe* from the Triassic. References to previous works on the subject of New Caledonian paleobotany are given.—*L. W. Sharp.*

2511. HESSELMAN, HENRIK. **Iakttagelser över Skogsträdspollens Spridningsförmaga.** [**Dissemination of pollen from forest trees.**] Meddel. Stat. Skogsforsoksanst. 16: 27–60. *3 fig.* 1919.—See Bot. Absts. 4, Entry 232.

2512. JESSEN, KNUD. **Mindre Middelelser om Fortidens Plantevaekst i Danmark.** [**Short communication on Denmark's past vegetation.**] Bot. Tidsskr. 36: 51–56. 1917.

2513. KIDSTON, R. **List of the fossil plants from the Coal Measures of the Borings at Bere Farm, Elham, Folkestone and Lydden Valley, Kent.** Mem. Geol. Surv., Summary of Progress for 1918: 46–49. 1919.—The probable connection of the Carboniferous of Britain

with that of Belgium, Holland and northeastern France beneath the thick series of Mesozoic and Cenozoic rocks bordering the Channel is further substantiated by these deep borings in Southeastern England where the Coal Measures were reached at 1598, 1358, 1487 and 939 feet in the respective bores enumerated in the title of the report. In all cases it was possible to identify a considerable variety of well known Carboniferous plant species from these bores. These are enumerated and briefly discussed.—*E. W. Berry.*

2514. Nathorst, A. G. **Die erste Entdeckung der fossilen Dryasflora in der Schweiz. [First discovery of Swiss fossil Dryas flora.]** Geol. Fören. Förhandl. **41**[5]: 454–456. 1919.

2515. Nathorst, A. G. **Zwei kleine paläobotanische Notizen. [Two short notes on paleobotany.]** Geol. Fören, Förhandl. **41**[5]: 457–459. 1919.—Refers *Dictyodendron Kidstonii* from the Paleozoic of Spitzbergen to the genus Arctodendron because the former genus is preoccupied, and suggests that *Ginkgo adiantoides* from the Tertiary of Spitzbergen may represent the existing *G. biloba.*—*E. W. Berry.*

2516. [Nordstedt, C. T. O.] [Swedish rev. of: Hasselman, H. **Iaktagelser öfver skogsträdens spridningsformåga. (Observations on the power of distribution of forest trees.)** Medd. Statens Skogsforsoksanst. **16**: 27–66. 1919.] Bot. Notiser **1919**: 167–168. 1919.—See Bot. Absts. 4, Entry 232.

2517. Seward, A. C. **Fossil plants.** Vol. 4. Cambridge, 1919.—This, the concluding volume of the Cambridge text on fossil plants, is devoted to the Ginkgoales, Coniferales and Gnetales. In each case the recent representatives are described before the fossil forms are considered, the discussion of the recent Coniferales being especially full. New generic names proposed are **Ginkgoites, Mesembrioxylon** and **Cupressinocladus.** The recent conifers are segregated into the following nine families: Araucarineae, Cupressineae, Callitrineae, Sequoiineae, Sciadopitineae, Abietineae, Podocarpineae, Phyllocladineae, and Taxineae. The author regards the Coniferales as monophyletic and considers the Araucarineae as the most ancient family. He believes that the cone scales of this family are morphologically simple ovuliferous leaves, the double cone scales of the Abietineae being derivatives of a simple form of sporophyll, and that the latter family is the most modern.—*E. W. Berry.*

2518. Sumner, F. B. **Adaptation and the problem of organic purposefulness, II.** Amer. Nat. **53**: 338–369. 1919.—In case of regulative phenomena like regeneration which cannot be explained by a mechanism specially adapted or preformed for their performance, author holds that responses are results of experimentation or of method of trial and error; absence of a part is thought to serve as stimulus to varied metabolic activities and that such as act to restore normal condition tend to be continued. Author does not believe with Driesch that reparative processes move directly toward end. Perfect regeneration exceptional and formation of useless structures does not argue for a "primary teleology" in nature. Author sees some similarity in regeneration of crystal and of mutilated organisms but restoration in latter is not so direct due to greater complexity of its substance. In course of evolution adjustments between organism and environment (racial adaptations) arose through chance variation, i.e., variation that was causally unrelated to any need to be fulfilled. [See Bot. Absts 3, Entry 2202.]—*J. P. Kelly.*

2519. Twenhofel, W. H. **Pre-Cambrian and Carboniferous Algal Deposits.** Amer. Jour. Sci. **48**: 339–352. *5 fig.* 1919.—Discusses algae as agents of rock formation, emphasizing their importance and suggesting the term coenoplase for the laminated precipitate of calcium carbonate resulting from algal metabolism. A new species, *Collenia kona*, is described from the Pre-Cambrian Kona dolomite of the Marquette region of northern Michigan. The new genus **Ottonosia** is described from the Permian of southeastern Kansas, and the new genus **Osagia** from the Upper Carboniferous of the same region.—*E. W. Berry.*

2520. Willert, H. **Über Sphenophyllaceen im Saarbrücker Karbon. [Sphenophyllaceae in Saarbrück Carboniferous.]** Glückauf **53**: 384–387. *Pl. 2.* 1917.—Discusses the presence of *Sphenophyllum emarginatum, majus, cuneifolium, oblongifolium, angustifolium* and *myriophyllum* in the coal measures of the Saar field.—*E. W. Berry.*

PATHOLOGY

DONALD REDDICK, *Editor*

2521. ADAMS, SAMUEL. **A national law to license and regulate.** Rept. Iowa State Hortic. Soc. 53: 58–65. 1918.—A discussion of the inspection of fruit and the necessity of enacting a national law on the subject.—*L. H. Pammel.*

2522. AFRICA, EMILIO MACASAET. **The minimum application for the control of Hemileia.** Philippine Agric. For. 6: 251–271. 1918.—A brief review of previous literature on spraying of coffee trees is given. Spraying experiments were conducted to determine the strength of Bordeaux mixture that can be used most economically, and the number of applications that should be made, for the control of coffee leaf rust, *Hemileia vastatrix*, both efficiency and cost of treatment being considered. The author concludes that a 3: 3: 50 Bordeaux mixture (which he designates the "stock solution") diluted to three-quarters strength is a profitable concentration and that it should be applied about every 2 weeks.—*Errett Wallace.*

2523. ALLEN, W. J. **Control of peach leaf curl at Yanco Experiment Farm.** Agric. Gaz. New South Wales 29: 490. 1918.—Home-boiled lime-sulfur solution applied while trees were perfectly dormant gave better results than applications made at 2 later dates. This dormant treatment appears also to have controlled "rust."—*D. Reddick.*

2524. ALLEN, W. J., AND W. LE GAY BRERETON. **Powdery mildew of the apple.** Agric. Gaz. New South Wales 29: 408–412. 1918.—Based on experiments the following directions are given for the control of apple mildew: Prune off affected wood; spray four times with iron sulphide. Spray mixture is prepared according to Volck-Ballard formula. Bordeaux mixture and lime-sulfur solution have not given satisfactory results.—*D. Reddick.*

2525. ANDERSON, S. F. **Downy mildew of the vine. A warning.** Jour. Agric. [New Zealand] 16: 367–368. 1918.

2526. ANONYMOUS. **Disease on cacao estates in West Africa.** Tropical Life 15: 38. 1919.—A correspondent on the west coast of Africa reported his cacao trees dying and the trouble was identified by Dr. Guy Marshall of the British Museum as "die-back" fungus, *Diplodia.* Rules for the control of the disease are quoted from a book on cocoa by DR. VAN HALL.—*H. N. Vinall.*

2527. ANONYMOUS. **Coffee planting for profit. No. 23.** Tropical Life 15: 4–5. 1919.—Compilated material reporting the appearance of coffee leaf disease (*Hemileia vastatrix*) at the Government farm, Kibos, British East Africa and its control by spraying with quarter strength fungicides such as liver of sulphur and Bordeaux mixture. The occurrence of a species of thrips on the coffee plants in the Nairobi and Kyamba districts is also noted.—*H. N. Vinall.*

2528. ANONYMOUS [B. O. DODGE]. **Index to American mycological literature.** Mycologia 11: 227–230. 1919.

2529. ANONYMOUS. **Seed mixtures for land affected by clover sickness.** Jour. Bd. Agric. [Great Britain.] 25: 1497–1499. 1919.

2530. ANONYMOUS. **Silver leaf in fruit trees.** Jour. Bd. Agric. [Great Britain] 26: 162–168. *5 fig.* 1919.

2531. ANONYMOUS. **Spraying.** Missouri Bot. Gard. Bull. 7: 19–25. *Pl. 5.* 1919.—Lists of the more common fungous and insect pests with suggestions for control.—*O. T. Wilson.*

2532. Anonymous. **Report on the occurrence of insect and fungus pests on plants in England and Wales in the year 1917.** Bd. Agric. Fish. Misc. Publ. [London] 21. *32 p.* 1918. —A summary drawn up by Plant Disease Sub-Committee of Technical Committee of Food Production Department, giving occurrence and severity of attack on cultivated plants of insect and fungus pests in 1917.—*Anna E. Jenkins.*

2533. Anonymous. **Tabla para los tratamientos anticriptogamicos e insecticidas de las plantas citricas. [Spray calender for citrus fruit.]** Revist. Agric. Com. y Trab. 2: 442. 1919. —Translated from Ext. Bull. 18, Univ. Florida, by S. C. Bruner and A. Padrón.

2534. Anonymous. **Programm und Jahresbericht der K. K. höheren Lehranstalt für Wein- und Obstbau in Klosterneuburg für das Schuljahr 1917–18. [Annual report of the horticultural institute in K. for 1917–18.]** *135 p.* Wien, 1918.—Chiefly entomological, especially on galls caused by aphides.—Notes on grape chlorosis, the mildews (*Plasmopara* and *Oidium*), and on spraying with Kuprol and silver nucleate. [Through abst. by Matouschek in Zeitschr. Pflanzenkr. 29: 105–106. 1919.]—*D. Reddick.*

2535. Anonymous. **Criptogamas de la vid. [Diseases of the vine.]** Informacion Agric. [Madrid] 9: 269–270. *1 fig.* 1919.—A popular account of grape mildew (*Oidium sp.*)—*John A. Stevenson.*

2536. Anonymous. [B. O. Dodge]. **Index to American mycological literature.** Mycologia 11:-284–287. 1919.

2537. Anonymous. **Contra la carie y el carbon de los cereales. [Against bunt and smut of cereals.]** Informacion Agric. [Madrid] 9: 279. 1919.—Formalin treatment for cereal smuts, the formula and method of using.—*John A. Stevenson.*

2538. Anonymous. **Plant legislation in Dominica.** Agric. News [Barbados] 18: 292. 1919.—This is a summary of the plant and seed quarantine regulations in force in the island of Dominica, including recent legislation forbidding the importation into the colony of citrus plants except from the islands of Montserrat, St. Lucia, and Grenada, and of growing or sprouting coconuts from the islands of Trinidad and Grenada.—*J. S. Dash.*

2539. Anonymous. **Recent plant legislation in Grenada.** Agric. News [Barbados] 18: 169. 1919.—Account is given of the quarantine regulations in force with regard to the importation of coconuts.—*J. S. Dash.*

2540. Anonymous. **Plant legislation in St. Vincent.** Agric. News [Barbados] 18: 237. 1919.—This is a summary of the quarantine regulations and cotton disease prevention ordinances.—*J. S. Dash.*

2541. Anonymous. **Botrytis.** Kew Bull. Misc. Inf. [London] 1919: 93. 1919.—In an investigation of *Botrytis cinerea* it has been shown by W. B. Brierley that the pathogene may exist in the host in a free plasmodial state and in this condition pass from cell to cell. He considers that *Botrytis cinerea* is composed of numerous elementary species and that the particular morphological features presented by any particular culture depends upon the elementary species present and upon the nature of the culture medium.—*E. M. Wilcox.*

2542. Anonymous. **Diseases.** Kew Bull. Misc. Inf. [London] 1919: 91–92. 1919.—This is a series of brief notes on the occurrence of the following diseases in England during 1918: wheat stripe rust (*Dicaeoma glumarum*), wheat powdery mildew (*Erysiphe graminis*), gooseberry powdery mildew (*Sphaerotheca mors-uvae*), pine blister rust (*Cronartium ribicola*), tomato damping off (*Phytophthora* sp.) and cucumber leaf blotch (*Colletotrichum oligochaetum*).—*E. M. Wilcox.*

2543. Anonymous. **Onion disease.** Kew Bull. Misc. Inf. [London] **1919**:-93-94. 1919.—A discussion of the studies by Miss Owen of *Sclerotium cepivorum* Berkeley as a pathogene attacking the bulb of the common onion (*Allium cepa*). Infection occurs through the roots. Both conidia and sclerotia are formed on bulbs in the soil but the ascigerous stage has not been found.—*E. M. Wilcox.*

2544. Anonymous. **Black currant rust.** Kew Bull. Misc. Inf. [London] **1919**: 94. 1919.—An examination of 200 black currant bushes (*Ribes nigrum*) failed to develop any evidence of the hibernation of the uredinial phase of *Cronartium ribicola.*—*E. M. Wilcox.*

2545. Anonymous. **Potato disease.** Kew Bull. Misc. Inf. [London] **1919**: 94. 1919.—In a further study of the skin spot disease of the potato Miss Owen has shown that the pathogen is distinct from *Spicaria* in which genus it had formerly been placed.—*E. M. Wilcox.*

2546. Anonymous. **Onion diseases.** Kew Bull. Misc. Inf. [London] **1919**: 92. 1919.—This is a brief statement regarding a *Sclerotium* disease of the onion (*Allium cepa*) and shallot (*Allium ascalonicum*) and onion smut (*Urocystis cepulae*) in England. This appears to be the first published record of the occurrence of this smut in Great Britain.—*E. M. Wilcox.*

2547. Anonymous. **Plant cancer.** Missouri Bot. Gard. Bull. 7: 51–53. *Pl. 16–18.* 1919.—Popular treatment of the subject including a table of hosts attacked by *Bacterium tumefaciens* and descriptions of the tumors on each.—*O. T. Wilson.*

2548. Anonymous. **Berichten van den phytopathologischen dienst. [Reports of the phytopathological service.]** Tijdschr. Plantenz. 25: 195–200. 1919.—The phytopathological service issues reports on subjects of immediate and practical importance to growers. Four reports have appeared to date. Three of these are here reprinted, *viz.:* No. 1 on a Fusarium disease in spring wheat; No. 3 on the control of smuts in wheat and barley; No. 4 on the stripe disease of barley; No. 2 on the tomato canker is not reprinted since the article of which it is a brief appears in full in this number of Tijdschrift.—*H. H. Whetzel.*

2549. Anonymous. **Prejudicial effects of treatment with formalin upon the germination of seeds.** Sci. Amer. Suppl. 87: 164. 1919.

2550. Anstead, D. **The treatment of fungoid diseases on estates.** Agric. Jour. India **13**: 95–104. 1918.—A lecture delivered at the annual meeting of the United Planters' Association of Southern India, 1917.

2551. Appel, O. **Die Pflanzkartoffel. [The potato plant.]** Landw. Hefte 36. *39 p., 7 fig.* Paul Parey: Berlin, 1918.—See Bot. Absts. 3, Entry 1348.

2552. Arnaud, G. **Une maladie de la Rose de Noël (Helleborus niger). [A disease of Helleborus niger.]** Bull. Soc. Path. Veg. France 6: 10–12. 1919.—A smut, *Entyloma ranunculi*, not hitherto reported on this host has been found in two localities in France. It attacks the bases of the petioles near the ground. The leaves slowly die and are usually invaded by a secondary organism, *Coniothyrium hellebori.* Spraying with copper acetate, and sanitary measures are recommended for control.—*C. L. Shear.*

2553. Arthur, J. C. **Relation of host and parasite among fungi.** [Rev. of: Reed, George M. Physiological specialization of parasitic fungi. Mem. Brooklyn Bot. Gard. 1: 348–409. 1918. (See Bot. Absts. 1, Entry 1024.)] Bot. Gaz. 67: 180–181, Feb., 1919.

2554. Ashby, S. F. **Leaf roll disease of Irish potatoes.** Jour. Jamaica Agric. Soc. **23**: 44–46. 1919.—A résumé of a paper by Wortley (Phytopathology 8: 507–529) is given, since it is thought probable that the disease has occurred on potatoes grown in Jamaica from imported seed. The writer then recommends roguing the fields 6 weeks after planting, the use of healthy seed, and renewal of seed from outside the island at least every second year.—*John A. Stevenson.*

2555. Aubert, L.-G. L'oïdium et les chênes de l'Ouest de la France. [Oïdium and the oaks of western France.] Rev. Eaux et Forets 57: 189–195. 1919.—See Bot. Absts. 3, Entry 1996.

2556. Audbbert, O. La defense rationnelle de la vigne contre le mildiou. [Rational protection for grapevines against downy mildew.] Prog. Agric. et Vitic. 69: 445—449. 1918.—A definite plan for spraying the vineyard based on the development of new and unprotected foliage.—*D. Reddick.*

2557. Ball, E. D. The potato leafhopper and the hopperburn that it causes. Bienn. Rept. Wisconsin Dept. Agric. 1917–18: 76–102. *Pl. 1–6.* 1918. Also Wisconsin Dept. Agric. Bull. 23: 76–102. *Pl. 1–6.* 1919.—A part of the injury to potatoes usually known as tip burn is caused by the leaf hopper, *Empoasca mali.* This type of tip burn, conveniently designated as hopper burn, appears at first as ". . . . a triangular brown area at the tip of the leaf running back on the midrib . . . . followed by a progressive burning of the margin, usually from the tip backward but occasionally in more or less triangular spots appearing along the margin, each one of these centered in a lateral veinlet. These increase in area and the burnt narrow strip along the midrib remains green and in serious cases this weakens and dies and the leaf shrivels up." Adult parasites live through the winter, fly to the potato fields early in June, lay eggs and disappear during the month of August. Nymphs of the second generation appear during July, remain for the most part, on the particular leaf on which they were hatched, and furnish the adults for hibernation. Effective control measures, so far as worked out, consist of two applications of a contact insecticide applied in such a way as to reach the insect on the under side of the leaf, the first application being made when the burning begins to appear, the second two weeks later.—*Charles R. Stevenson.*

2558. Ball, E. D. Spray material and application. Rept. Iowa State Hortic. Soc. 53: 76–85. 1918.—A brief discussion of spraying and spray material.—*L. H. Pammel.*

2559. Ball, E. D. What burned the potato leaves last summer? Rept. Iowa State Hortic. Soc. 53: 335–336. 1918.—Ascribes the burning of potato leaves to a minute green leaf hopper (*Empoasci mali*) which hereafter is to be known as the potato leaf hopper.—*L. H. Pammel.*

2560. Ball, E. D., and S. B. Fracker. White pine blister rust. Bienn. Rept. Wisconsin Dept. Agric. 1917–18: 40–43. 1918. Also Wisconsin Dept. Agric. Bull. 23: 40–43. 1918.—Eradication of pine trees and species of *Ribes* affected with blister rust (*Cronartium ribicola*) in a limited area was successful.—Scouting in 1918 revealed the disease in 10 counties in which it had been hitherto unknown.—The infected area is too great to warrant further attempts at complete eradication of the disease from the State.—*D. Reddick.*

2561. Ball, E. D., and S. B. Fracker. The eradication of barberry in Wisconsin. Bienn. Rept. Wisconsin Sept. Agric. 1917–18: 44–56. 1918. Also Wisconsin Dept. Agric. Bull. 23: 44–56. 1918.—An account of the work done in Wisconsin as a part of the national program to eliminate aecial hosts of *Puccinia graminis* in the "wheat belt."—95,000 bushes are known to have been destroyed but it is estimated that the work of volunteers would bring the number up to 250,000.—Barberry was brought into the State by the earliest settlers and has escaped widely. Many interesting records were traced and are reported.—*D. Reddick.*

2562. Barber, C. A. Reminiscences of sugar cane work in India. Internat. Sugar Jour. 21: 390–395. 1919.

2563. Barss, H. P. International potato disease conference. Potato Mag. 2^2: 5–6, 27–30. *6 fig.* 1919.—Chiefly concerns leaf roll, mosaic, spindling sprout, and methods of cooperation. —*Donald Folsom.*

2564. Bartlett, F. A. Tree surgery. Sci. Amer. Suppl. 87: 200–201. *5 fig.* 1919.

2565. BEAUVERIE, J. **Sur quelques recherches recentes concernant le role des germes de rouilles contenues dans les semences de Graminées. [Some recent investigations concerning the role of rust spores contained in grass seeds.]** Bull. Soc. Path. Veg. France 5: 83–90. 1918. [Issued April, 1919.]—In the case of rust attacking seeds of grasses the parasite is always localized in the pericarp and does not reach the embryo. Author holds that the spores found on grain provide a means of insuring their propagation from year to year especially in cases where no aecia occur as in *Puccinia glumarum.* Uredinospores found on seed in the spring did not germinate. Teliospores were frequently found but have not been tested. The work of CARLETON, ZUKAL, GASSNER and HUNGERFORD is referred to. The negative results reported by authors are not considered conclusive and the probability of transmission by contaminated seed is maintained.—*C. L. Shear.*

2566. BIERS, P. **Un Heterodera parasite de Gomphocarpus fruticosus. [Heterodera parasitic on Gomphocarpus.]** Bull. Soc. Path. Veg. France 6: 18–19. 1919.—A nematode which is regarded as a biologic form of *Heterodera radicicola* is reported on this host from Nice.—*C. L. Shear.*

2567. BERG, ANTHONY. **A simple method of distinguishing nematode galls of wheat from bunted kernels.** Phytopath. 9: 181–182. 1919.—Bunt infected kernels show an apical tuft of hair or brush. The nematode affected kernels have no brush and may be indented. They frequently form multiple kernels.—*R. E. Vaughn.*

2568. BETHEL, ELLSWORTH. **Puccinia subnitens and its aecial hosts.** Phytopath. 9: 193–201. 1919.—Based on author's observations and cultures of the writer up to January 1, 1919, the total number of aecial hosts of *Puccinia subnitens* for California, Colorado, Arizona, and New Mexico, is 76 species. These are of 48 genera and belong to 19 families. Including the collections of others, and from other localities, this number is increased to 84 host species, in 52 genera, belonging to 19 families. These hosts extend through the herbaceous dicotyledons from Polygonaceae to Lobeliaceae. Cultures show no racial tendencies. The aecia vary greatly in form even on the same plant. The chief telial host is *Distichlis spicata.*—*G. Wineland.*

2569. BIERS, P.-M. **Le Coprinus radicans (Desm.) Fr. est-il parasite? [Is Coprinus radicans a parasite?]** Bull. Soc. Path. Veg. France 6: 72–74. May–June, 1919.—The mycelial condition of the species mentioned has been regarded as a golden yellow growth generally referred to *Ozonium* and sometimes specifically to *O. auricomum* Link. The author records observations on the occurrence of *Ozonium* associated with this *Coprinus* on chestnut (*Castanea*) and poplar (*Populus*) under conditions suggesting its parasitic nature.—*C. L. Shear.*

2570. BILLANDO, EMILIO. **Las enfermedades del garbanzo. [Diseases of the chick-pea.]** Informacion Agric. [Madrid] 9: 194. 1919.—This important Spanish crop is seriously attacked by insect pests and a fungous disease. This latter (species undetermined) is controlled by treating the seed before planting with copper sulphate solution and by spraying the crop three times with Bordeaux mixture. Late planting also helps to minimize losses.—*John A. Stevenson.*

2571. BISBY, G. R., AND A. G. TOLAAS. **Good results from spraying in Minnesota.** Potato Mag. 2^1: 12–13. *2 fig.* 1919.—Bordeaux mixture increases yield regardless of late blight (*Phytophthora infestans*).—*Donald Folsom.*

2572. BLAIR, W. SAXBY. **Dusting fruit trees for insects and disease.** Agric. Gaz. Canada 6: 16–18. 1919.—A report is given on the amount of scab and insect injury in an orchard of Gravenstein apple trees where two methods of treatment were used. The standard lime-sulphur arsenate liquid spray was compared with the fine sulphur powder combined with dry arsenate of lead as a dust. The two methods showed little difference in efficiency in controlling scab and insects. Dusting was more expensive in cost of material, but is a time saver. It seems to be a personal question with the grower whether he can dust more profitably than spray.—*O. W. Dynes.*

2573. Blanchard, E., and C. Perret. Recherches relatives a la maladie de l'enroulement de la pomme de terre effectuées dans le département de la Loire. [Experiments on leaf roll of potatoes in Loire.] Ann. Serv. Épiph. 5: 245–252. *Pl. 1.* 1918.—Leaf roll has appeared in Loire and adjoining provinces and probably has existed there since 1909. Early varieties like Early rose, l'Institut de Beauvais, Merveille d'Amerique, and Franco-Russe are especially susceptible but Richter Impérator, a mid-season variety, has not proved resistant. Violette d'Auvergne appears to possess resistance but is susceptible to rot.—Andrea and Fluck geante are also resistant.—Richter Impérator (susceptible), when free from leaf roll yielded 4,500 kilos more per hectare than Violette du Farez (resistant), but under disease conditions yielded 4,300 kilos less.—The use of stable manure or of nitrate of soda reduces the loss from leaf roll.—Disinfection experiments indicate that if leaf roll is caused by an organism, the germ does not persist in the soil or on the surface of the tuber.—*D. Reddick.*

2574. Blanchard, E., and Claude Perret. Sur l'enroulement des feuilles de la pomme de terre. [Potato leaf roll.] Compt. Rend. Acad. Agric. France 5: 356–358. 1919.—The results of experiments continuing for several years lead to the belief that nitrogen hunger is the chief symptom of the disease. It is considered a degenerative disease which is brought about by continued asexual reproduction, too frequent planting on the same soil, deficiency in potash, etc. It is ameliorated by abundant fertilization with sodium nitrate, although this is not a cure, at least in the first year. All varieties tested were found subject to the disease, but not to an equal degree. In even the most susceptible varieties, some individuals proved entirely immune.—*E. A. Bessey.*

2575. Boas. [Weihenstephan.] [Rev. of: Bohm, Fr. Die züchterische Bekämpfung der Blattrollkrankheit der Kartoffeln. (Control, through breeding, of the leafroll disease of potatoes.) Illustr. Landw. Zeitg. 37: 341–342. 1917.] Zeitschr. Pflanzenkrankh. 29: 54. 1919. —Author, from his experiences, states that the hereditary, infectious leafroll disease is to be distinguished from the non-hereditary through the paler color of the leaves. The cause of the hereditary trouble is held to be due to a species of *Fusarium.* Dry warm weather favors the development of the disease. The paper reviews other work done on this trouble to gain a clear meaning of the leafroll diseases. Author refers finally to the question of deterioration, quoting as an example a variety of potato, which he has studied since the seventies of last century. The variety is now so badly deteriorated, that one finds it difficult to secure the necessary quantity of seed potatoes.—*H. T. Güssow.*

2576. Braun, Harry. Presoaking as a means of preventing seed injury due to disinfectants and of increasing germicidal efficiency. Science 49: 544–545. 1919.—In the course of investigations on the bacterial black-chaff disease of wheat, a new method of seed treatment has been discovered which practically eliminates seed injury due to the use of disinfectants, and at the same time renders pathogenes on the seed coats more susceptible to the action of the disinfectant. The seeds are allowed to absorb water for a definite period in advance of treatment. The saturation of the cells and the cell walls with water before treatment, and the dilution of the full-strength disinfectant beyond the point of injury as it enters the tissues, in accordance with the law of diffusion of dissolved substances, is the explanation of the results obtained. According to this method, infected seeds are soaked in water for ten minutes, then drained and kept moist for six hours. They are then soaked for ten minutes in formalin 1 : 400 solution, drained, and covered for 6 hours. They are then dried over night and planted next day. If copper sulphate is used, presoaked seeds are thoroughly wetted in the 1 : 80 solution, drained and kept moist 20 minutes, plunged for a moment into milk of lime, dried over night and planted. Nine different varieties of wheat, also oats, barley and maize have been treated successfully by this method.—*A. H. Chivers.*

2577. Brick, C. Bericht über die Tätigkeit der Abteilung für Pflanzenschutz für die Zeit vom 1 Juli, 1916, bis 30 Juni, 1917. [Work of the division for plant protection, 1916–1917.] Jahrb. Hamburger wiss. Anst. 1918: 16. 1918.—Gooseberry mildew (*Sphaerotheca mors-uvae*)

was found in Mecklenburg.—Tomato leaf blight (*Septoria lycopersici*) was controlled experimentally with perocid but Bordeaux mixture is preferable.—[Through abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 104–105. 1919.]—*D. Reddick.*

2578. Brick, C. **Die Schwarzfleckenkrankheit der Tomatenfrüchte durch Phoma dedestructiva Plowr. [Black-spot disease of tomato fruits caused by Phoma destructiva.]** Zeitschr. Pflanzenkr. 29: 20–26. *1 fig.* 1919.—Author records the appearance of this disease on tomato fruits in the Vierlanden region near Hamburg, Germany. Fruits dropped before maturity, showing a circular, increasing, black spot, of from 3 cm. diameter and more around the fruit stem. Spots may appear on other parts of the fruit. Numerous pycnidia were present, which were identified eventually as *Phoma destructiva.* Discusses presence and nature of numerous other fungi observed in association with *Phoma* by himself and others. Recommends destruction of all infected fruits, and rotation.—*H. T. Güssow.*

2579. Briosi, G., and R. Farneti. **La moria dei castagni (mal dell' inchiostro). [Black canker of chestnut.]** Atti Inst. Bot. Univ. Pavia 2, 15: 43–51. *2 fig.* 1918.—Controversial.—Comparisons are made to show why *Melanconis modonia* should be considered distinct from *M. perniciosa, Coryneum perniciosum* and *Fusicoccum perniciosum.*—*F. M. Blodgett.*

2580. Brodrick, F. W. **A new disease in parsnips.** Agric. Gaz. Canada 6: 461–462. 1919.—Parsnip canker has been found in Manitoba. It is not transferred by means of soil or of diseased tissue spread over the soil. The disease is thought to be the same as that described by Cotton [See Bot. Absts. 3, Entry 395.] a review of whose paper is included.—*D. Reddick.*

2581. Brown, H. B. **Cotton experiments 1918.** Mississippi Agric. Exp. Sta. Bull. 186. *31 p., 3 fig.* 1919.

2582. Brunér, Esteban C. **La enfermedad del "mosaico" o de "rayas amarillas" de la caña de azúcar en Cuba. [Mosaic of sugar-cane in Cuba.]** Revist. Agric. Com. y Trab. 2: 437–441. *2 fig.* 1919.—The presence of the mosaic of sugar cane is reported in several centrals in Cuba where it seems probable it was introduced in experimental plantings. A review is presented of the previous experiments with this disease.—*F. M. Blodgett.*

2583. Bruner, Stephen. **La "Phomopsis" de la berengena. [Phomopsis of the eggplant.]** Revista Agric. [Mexico] 4: 31–32. *1 fig.* 1919.—See Bot. Absts. 2, Entry 757.

2584. Burroughs, G. D. **Sweet potato storage houses in North Carolina.** Potato Mag. 2^4: 8–9. *2 fig.* 1919.

2585. Cadoret, A. **La lutte contre le mildiou en 1918. [Grape downy mildew control during 1918.]** Prog. Agric. Vitic. 69: 392–393. 1918.

2586. Calvino, Mario. **Informe del director. [Report of the Director.]** Informe An. Estac. Exp. Agron. [Cuba] 1917–1918: 1–439. 1919.—Plants under trial were attacked by fungous diseases as follows, *Sphacelotheca sorghi* and *Puccinia purpurea* on sorghum, *Piricularia grisea* on rice, *Sclerotium rolfsii* on *Helianthus tuberosus, Phytophthora terrestria* on roselle (*Hibiscus sabdariffa*), *Cercospora beticola* on *Beta cycla, Uredo arachidis* and *Cercospora personata* on peanut, *Cercospora sesami* on *Sesamum, Pucciniopsis caricae, Gloeosporium* sp. and *Rhizoctonia solani* on *Carica papaya.* [See Bot. Absts. 4, Entries 45, 497.]—*John A. Stevenson.*

2587. Cambpell, J. A. **Control of brown rot.** Jour. Agric. [New Zealand] 16: 221–222. 1918.—Brief outline of experiments in progress. Brown rot of stone fruits has been unusually severe on account of wet seasons. Repressive measures have not been effective.—*D. Reddick.*

2588. Canio, R. **Pseudo-tuberculose clinique et experimentale à Penicillium glaucum. [Clinical and experimental pseudo-tuberculosis due to P. glaucum.]** Jour. Méd. Bordeaux, June, 1918.

2589. Capus, J. **Note sur le développement de quelques maladies des plantes pendant la sécheresse. [Note on the development of some plant diesases during drought.]** Bull. Soc. Path. Veg. France 5: 94–97. 1919. [Issued April, 1919.]—Statements are made in regard to the development of black rot of grape, sycamore blight caused by *Gnomonia veneta,* and rust of wheat, during 1918 in France. In April and May there were long, cold, rainy periods followed by long dry periods in June and July. Infection occurred during the wet periods but the parasites continued to develop during the drought, their appearance being delayed by lengthy periods of incubation.—*C. L. Shear.*

2590. Capus, J. **Expériences sur le valeur comparée contre le mildiou de la vigne des bouillies cupriques basiques et des bouillies acides. [Experiments on the comparative value of basic and acid copper mixtures for the control of Plasmopara viticola.]** Ann. Serv. Epiph. 5: 201–209. 1918.—Five different mixtures were employed. Equal protection is afforded by all five mixtures for a period of 20 days but for longer periods the basic mixtures are better. Basic mixtures are immediately effective. Field experiments, which are described, were supplemented by spore germinations studies in the laboratory.—*D. Reddick.*

2591. Capus, J. **Invasion des cultures de pois en Gironde par Heterodera schachti Schmidt. [Heterodera attacking peas in Gironde.]** Ann. Serv. Épiph. 5: 239–244. 1918.—Evidence is presented to show that this nematode is responsible for root rot and death of peas rather than *Fusarium vasinfectum* var. *pisi* although the fungus may be present and help to complete the destruction.—Use of nonsusceptible crops in rotation is suggested as a means of control.—*D. Reddick.*

2592. Cardin, Patricio. **Informe del Departamento de Entomologia y Patologia Vegetal. [Report of the Department of Entomology and Plant Pathology.]** Informe. An. Estac. Exp. Agron. [Cuba] 1917–1918: 462–465. 1919.—Review of work in plant pathology.—*John A. Stevenson.*

2593. Carpenter, C. W. **Report of the Division of Plant Pathology.** Hawaii Agric. Exp. Sta. Rept. 1918: 10, 35–45. *Pl. 8–10.* 1919.—Freckle or black spot disease (*Phoma musae* n. sp.) affecting the Chinese banana (*Musa cavendishii*) is illustrated and described. The diseases of Irish potatoes investigated are as follows: Mite disease, late blight (*Phytophthora infestans*), wilt (*Fusarium oxysporum*), and early blight (*Alternaria solani*). An annotated list of diseases affecting coffee and miscellaneous island crops is given.—*J. M. Westgate.*

2594. Charmeaux, Francois. **L'ensachage du raisin de table, son origine, ses raisons, ses resultats. [The bagging of grapes, its origin, reasons, and results.]** Jour. Soc. Nation. Hortic. IV, 20: 52–56, 75–79. March and April. 1919.—See Bot. Absts. 3, Entry 2320.

2595. Cheel, E., and J. B. Cleland. **Disease in forest trees caused by the larger fungi.** Forestry Comm. New South Wales Bull. 12. *12 p., 20 pl.* 1918.—Distinguishing characters and distribution are given for about 20 important timber destroying fungi recorded for New South Wales.—*Anna E. Jenkins.*

2596. Chiffot, J. **Sur la présence de l'ergot de seigle sur le blé dit du Manitoba. [The presence of ergot of rye on Manitoba wheat.]** Bull. Trimest. Soc. Mycol. France 34: 192–194. *Pl. 8.* 1919.—The author discusses *Claviceps purpurea* variety *tritici* which he found on Canadian wheat. [See next following Entry, 2597.]—*Fred C. Werkenthin.*

2597. Chifflot, J. **Sur la présence de l'ergot de seigle sur le blé dit "du Manitoba." [The occurrence of ergot of rye on "Manitoba" wheat.]** Bull. Soc. Path. Veg. France 5: 80–82. 1918. [Issued April, 1919.]—The presence of this parasite on Canadian wheat recently introduced into France is reported. It is suggested that this form may be sufficiently distinct to be called *Claviceps tritici manitobae.*—More investigations and observations are necessary in order to determine the danger from this parasite and whether it will pass from wheat to rye or to other grasses. [See next preceding Entry, 2596.]—*C. L. Shear.*

2598. Childs, Leroy. **A spray program for the northwest apple orchards.** Better Fruit 13^{10}: 13–14. Apr., 1919.—A reprint of a spray program or calendar first published in Better Fruit, April, 1918. It gives complete information for spraying apples in the Pacific Northwest.—*A. E. Murneek.*

2599. Childs, Leroy. **Comparative results in controlling codling moth.** Better Fruit 13^{9}: 5, 41–46. March, 1919.—This paper deals with comparative results of the effectiveness and economy of dusting and spraying and the use of the spray gun versus the spray rod in combating scab and codling moth on apples in Hood River valley, Oregon. Experimental evidence is offered for the seasons of 1916, 1917, and 1918. Spraying is preferred to dusting. The spray gun has been found to be superior to the spray rod. [See also Bot. Absts. 3, Entry 2321.]—*A. E. Murneek.*

2600. Clute, Willard N. **The potato wart disease.** Amer. Bot. 25: 95. *1 fig.* 1919.

2601. Cockayne, A. H. **Dry rot of turnips. Suggestions regarding control.** Jour. Agric. [New Zealand] 17: 70–73. 1918.—Dry rot, caused by *Phoma napo-brassicae*, occurs on turnips and mangolds that have been mechanically injured but Swedes may be affected up to 100 per cent whether injured or not.—Author summarizes investigational work done as follows: (1) Infection appears earlier on early sowings than on late ones; (2) Crops with 20 per cent of bulbs affected on, say, the third week of July may have 100 per cent affected a couple of months later, in September; (3) Little loss is experienced with crops fed off before the middle of July; (4) All varieties of Swedes so far experimented with appear equally affected; (5) Swedes following affected Swede crops are affected at a younger stage than when grown on clean land; (6) Lime appears to delay infection; (7) Stored Swedes covered appear to keep much better than when in the field. Earthing up bulbs stops infection.—Recommendation is to substitute some other crops for Swedes until some method of control is developed.—*D. Reddick.*

2602. Coleman, Leslie C. **Spike disease of sandal.** Dept. Agric. Mysore State, Mycol. Ser., Bull. 3. *52 p., 19 pl., 2 fig.* 1917. [Appeared 1918.]—The very serious spike disease of sandal is rather fully discussed. Large portions of the sandal wood area of India have already become seriously affected. It is considered improbable that unfavorable soil or climatic conditions, overcrowding, association with unsuitable host plants can in themselves engender the disease. It is held more probable that a definite causative agent or organism is involved, and that its subsequent virulence and spread is modified by these external conditions. An accumulation of starch in the leaves, and the death of the haustoria and root tips are striking symptoms. No evidence has been added to show that the attacks of fungi or insects produce the disease. It has been established for the first time that the disease is readily communicable by grafting, and it is considered that it is a virus disease, i.e., comparable to such diseases as peach yellows, the mosaic disease of tobacco, etc. It is noted that other species of plants in the sandal wood area are affected with diseases similar to the spike disease of sandal, but relationships have not as yet been definitely established. The carrying of seed from diseased trees by birds, the dissemination of the virus by insects, and infection from other plants affected with a similar disease, are considered possible means of spread of the spike disease of sandal.—*H. A. Allard.*

2603. Collard, J. W. **Control of brown rot. Peach orchard experiments at Henderson.** Jour. Agric. [New Zealand] 16: 275–283. *2 fig.* 1918.—Report, with tabulations of three extensive experiments made to determine the value in brown rot (*Monilia fructigena*) control of orchard sanitation (including soil dressing), dormant and summer spraying and combinations of them. The experience of the first season indicates that practically no repression of the disease was secured. The spraying program included dormant treatments with bordeaux mixture (8 : 6 : 40) and copper sulfate (1 : 15) and summer treatments with bordeaux (2 : 3 : 50), lime-sulfur solution (1 : 30) and atomic sulfur (8 : 100).—Late varieties were more severely affected than early ones although previously they had been thought more resistant.

—Probability of infection increases as fruits approach maturity "and several varieties of peaches and nectarines suffer attack almost entirely during that period" but "considerable number of the best varieties are affected at the rate of 40 per cent when quite green—chiefly just after stoning."—*D. Reddick.*

2604. Coons, G. H. **Michigan experiments on bean disease control.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 104–106. *4 fig.* Feb., 1919.—A popular account of anthracnose and bacterial blight of beans with recommendations as to mode of control.—*E. A. Bessey.*

2605. Coons, G. H. **Bordeaux mixture.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 18–19. *6 fig.* Aug., 1919.

2606. Coons, G. H. **Botanical notes.** Michigan Agric. Exp. Sta. Quart. Bull. 1: 159–162. May, 1919.—Brief notes on the following topics: Barley disease situation, potato spraying, seed-treatment of potatoes, and damping-off of seedlings, with recommendations for treatments in all cases. [See next following Entry, 2607.]—*E. A. Bessey.*

2607. Coons, G. H. **Botanical notes.** Michigan Agric. Exp. Sta. Quart. Bull. 2: 14–17. *Fig. 3–5.* Aug. 1919.—Warning notes on take-all and flag smut of wheat and wart disease of potato, and recommendations to urge spraying for apple scab and the Septoria blight of tomato. [See next preceding Entry, 2606.]—*E. A. Bessey.*

2608. Cordley, A. B. **Possible cause of "Sour Sap" in the Pacific Northwest.** Better Fruit 13^{11}: 6, 30–32. May, 1919.—See Bot. Absts. 3, Entry 2325.

2609. Cossette, J. R. **Two years of success with dusting.** Agric. Gaz. Canada 6: 168–169. 1919.—A report of the Oka Agricultural Institute, Quebec.—*O. W. Dynes.*

2610. Cotte, J. **Sur divers parasites des platanes à Nice en 1918. [On various parasites of sycamore (Platanus sp.) at Nice in 1918.]** Bull. Soc. Path. Veg. France 6: 65–67. May–June, 1919.—Besides insects, anthracnose caused by *Gloeosporium nervisequum* and a hypertrophy near the base of the trunk regarded as probably due to a parasite, are described.—*C. L. Shear.*

2611. Cotton, A. D. **Onion smut: a disease new to Britain.** Jour. Bd. Agric. [Great Britain] 26: 168–174. *1 fig.* 1919.—The disease (*Urocystis cepulae*) was first called to the attention of the Board of Agriculture by a grower in 1918, who had also observed the disease in 1917. Upon extended inquiry two former authentic collections were found—one on young leeks and onions near Edinburgh in 1912, and the other on leeks in Northumberland in 1914. In 1918 smut occurred on onions in a number of gardens in that locality. In no case was the original source of the disease determined.—A brief description of the disease is given together with suggestions for its control.—*M. B. McKay.*

2612. Cromwell, R. O. **A bad outbreak of cedar apple rust.** Rept. Iowa State Hortic. Soc. 53: 127–131. 1918.—A brief discussion of the relation of apple rust (*Gymnosporangium*) to cedar. Calls attention to the severity of the fungus on the Wealthy and in a less degree on Ben Davis and Jonathan varieties.—*L. H. Pammel.*

2613. Daniel, Lucien. **La maladie du chêne, ses causes et son remède. [Oak disease, its cause and its control.]** Trav. et Notices Acad. Agric. France 1: 421–440. 1918.—Oak mildew (*le blanc*) is abundant and destructive because of practices which have reduced the vitality of the trees. Particular objection is made to the practice of decapitating trees in order to force lateral branches which are used for firewood.—*D. Reddick.*

2614. Darnell-Smith, G. P. **Experiments on the control of brown rot in stone fruits.** Agric. Gaz. New South Wales 29: 663–664. 1918.—Cotton wool was saturated with formaldehyde and with sulfur dioxide and placed in perforated boxes inside packing cases of peaches

and nectarines. Both materials reduced the loss from rot in transit but the natural bloom of the fruit was destroyed. Control of rot in the orchard is thought to be the preferable means of reducing such losses.—*D. Reddick.*

2615. Darnell-Smith, G. P. **A fungous disease of prickly pear.** Agric. Gaz. New South Wales 29: 440–441. 1918.—*Opuntia inermis* was found parasitized by a species of *Fusarium* which is not named. There are indications that the fungus may be valuable in helping to exterminate this "pest-pear" and experiments are projected.—*D. Reddick.*

2616. Dash, J. Sydney. **Quelques conseils aux producteurs de cannes de la Guadeloupe. [Hints to the sugar-cane growers of Guadeloupe.]** Sta. Agron. Guadeloupe Bull. 1: 11–30. 1919.—Observations on the Island lead to conclusion that better drainage should be provided. Most soils require lime and stable manure or the use of leguminous soiling crops.—Selection of varieties suitable for Guadeloupe requires more attention. Preparation of soil and general cultural directions are given.—An account of the insects and diseases affecting the sugar-cane in Guadeloupe is presented. It is noted that there are no diseases in Guadeloupe which do not exist in the Lesser Antilles. Root disease, *Marasmius sacchari*, being by far the worst in the colony, is dealt with fully and the usual methods of treatment discussed at some length, viz., healthy cuttings, proper tillage, rotation, sanitation, increased use of farmyard manure, use of bordeaux mixture.—*J. S. Dash.*

2617. Degrully, L. **Action des fumures sur le mildiou. [Action of manuring on grape downy mildew.]** Prog. Agric. et Vitic. 69: 531–533. 1918.—Heavy applications of nitrogenous fertilizers favor the development of downy mildew.—*D. Reddick.*

2618. Dey, P. K. **Studies in the physiology of parasitism. V. Infection by Colletotrichum Lindemuthianum.** Ann. Botany 33: 305–312. *Pl. 21.* 1919.—The author investigated the method by which *Colletotrichum lindemuthianum* gains entrance into the pods of two susceptible bean varieties (*Phaseolus vulgaris*). The spores germinate on the surface, sending out a germ tube which forms an appressorium as a result of a contact stimulus. The appresorium becomes fastened to the leaf surface by means of a mucilaginous sheath. The spore is also fixed in some unknown manner. The germ tube curves upward, thus exerting some pressure on the leaf surface. From a part of the appressorium in contact with the cuticle, is developed a peg-like infection thread which ruptures the cuticle. According to the author the penetration of the cuticle is effected merely by mechanical pressure but the subcuticular layers are softened and disorganized, presumably by an enzyme. The infection peg swells to the size of a normal hypha shortly after penetrating the cuticle, grows into the host tissues and produces a small vesicle from which branches ramify. The host cells do not collapse until invaded by the fungus. According to the author *C. lindemuthianum* therefore gains entrance into the host quite as does *Botrytis cinerea.*—*E. C. Stakman.*

2619. Dickson, J. G., and A. G. Johnson. **Studies on stem rust in Wisconsin, 1918.** Bienn. Rept. Wisconsin Dept. Agric. 1917–18: 56–60. 1918. Also Wisconsin Dept. Agric. Bull. 23: 56–60. 1918.—Studies begun late in the winter and carried throughout the summer were so conducted as to furnish data upon the rôle of the common barberry (*Berberis vulgaris*) in the spread of the stem rust of grains (*Puccinia graminis*). Urediniospores which had formed on the new fall shoots of perennial grasses and winter grains retained their ability to grow until the winter covering of snow had disappeared, about March 2, after which the viability decreased very rapidly. None retained ability to grow after March 30. Observations made at seventeen definitely marked stations in the vicinity of Madison as well as a survey over the southern part of the state, gave no evidence of infections on wheat in advance of the time when they could have come from infected barberries. From observations made at about fifty selected stations it was noted that the original infection was definitely traceable directly to infections on barberries. Spring infection was noted first only in close proximity to infected barberries the spread of the rust being always more abundant to the northeast of the barberry planting. It was observed that the kind of grain that was commonly grown in a locality was universally heavily rusted, while grains new to a locality, with the exception of barley, were rarely rusted.—*L. M. Massey.*

2620. Doidge, E. M. **Common fungous and bacterial diseases of plants.** Union of South Africa, Dept. Agric. Bull. (Local Ser.) 78. 1919.—An illustrated chart of plant diseases with remedial measures for the use of farmers and fruit growers.—*E. M. Doidge.*

2621. Doidge, E. M. **Walnut bacteriosis, Bacterium juglandis Pierce.** South African Jour. Sci. **15**: 407–412. 1919.—Walnut bacteriosis occurs in a number of localities in South Africa, and often causes serious damage, especially in wet seasons and in places where rain falls in the spring and early summer. In the Oudtshoorn district, which has a winter rainfall of about 10 inches and little or no summer rain, no bacteriosis has been observed. The organism has been isolated, studied in pure culture and the disease reproduced by inoculation.—*E. M. Doidge.*

2622. Doidge, Ethel M. **The bacterial blight of beans.** South African Jour. Sci. **15**: 503–505. 1919.—The bacterial blight of beans (*Phaseolus vulgaris* and *P. lunatus*) is common in South Africa. The organism is disseminated with contaminated seed both from local sources and imported from overseas. It has been isolated, and studied in pure culture, and the disease reproduced by inoculation; the organism is *Bacterium phaseoli*, originally described as causing bacteriosis in beans in America.—*E. M. Doidge.*

2623. Doidge, Ethel M. **Diseases of stone fruit trees, I. Peach leaf curl. Taphrina deformans (Fckl.) Tul.** South African Fruit Grower **6**: 211. 1919.

2624. Doidge, Ethel M. **Walnut blight.** Union of South Africa, Dept. Agric. Bull. 1918[14]. *4 p. 2 fig.* 1918.—Disease (caused by *Bacterium juglandis*) is prevalent in all parts of country where conditions are favorable. "The blight only spreads rapidly where there is a good deal of rain and mist during the spring and summer while the nuts are forming."—*D. Reddick.*

2625. Duysen, F. **Holzwucherungen. [Intumescences in wood.]** Sitzungsber. Ges. Naturforsch. Freunde Berlin **1918**: 67–82. *14 fig.* 1918.

2626. Easlea, Walter. **Mildew resistant roses: with some suggestions as to increasing their number.** Jour. Roy. Hortic. Soc. **43**: 253–260. 1919.—See Bot. Absts. 3, Entries 2119 and 2256.

2627. Ensign, M. R. **Sweet potato mosaic.** Phytopath. **9**: 181. 1919.—The leaves are dwarfed, malformed, and mottled. Yields showed a difference of 300 per cent. There is no evidence that the disease is directly communicable to adjacent plants.—*R. E. Vaughn.*

2628. Eriksson, Jacob. **Zwei russische Gymnosporangieen. [Two Russian gymnosporangia.]** Ark. Bot. [Stockholm] **15**: 1–23. *3 pl.* 1919.

2629. Esam, Gordon. **Orchard sprays and spraying.** Jour. Agric. [New Zealand] **17**: 103–109. 1918.

2630. Esmarch, F. **Zur Kenntniss des Stoffwechsels in blattrollkranken Kartoffeln. [Metabolism in potato leafroll.]** Zeitschr. Pflanzenkr. **29**: 1–20. 1919.—Author inclines to agree with Quanjer who, from his anatomical studies of leafroll, suggests that there occurs an extensive check in the translocation of the assimilates of the leaves. This factor is undoubtedly to be regarded as a symptom of "potato leafroll." He continues that, in consequence of this check, there results an increase of the starch contents in the leaves of leafroll plants. The chloroplasts can only store a limited amount of starch, hence, once this limit is reached, there must result a check to the assimilation, inasmuch as less soluble carbohydrates are produced. As a consequence less reserve materials reach the vegetative centers, and the characteristic dwarfed habit of the plants, as well as their reduced yield in tubers, becomes manifest. Author prefers not to draw any further conclusions relative to the etiology of the leafroll disease. The check in translocation of starch is an important, though

not the only physiological symptom of the disease. Presumably the rolling of the leaves occurs as a consequence of the disturbed metabolism present internally. He doubts, however, whether anatomical abnormalities such as Quanjer's phloem necrosis may be regarded as causal to the reduced translocation of starch.—*H. T. Güssow.*

2631. Eustace, H. J. **Horticultural notes.** Michigan Agric. Exp. Sta. Quart. Bull. **1**: 133. Feb., 1919.—See Bot. Absts. 3, Entry 2331.

2632. Eustace, H. J., and R. H. Pettit. **Spray and practice outline for fruit growers.** Michigan Agric. Exp. Sta. Special Bull. 93. *32 p., 6 fig.* 1919.—See Bot. Absts. 3, Entry 2332.

2633. Eyre, J. Vargas, E. S. Salmon, and L. K. Wormald. **Further notes on the powdery mildews and the ammonium polysulphide wash.** Jour. Bd. Agric. Great Britain **25**: 1494–1497. 1919.—During the stage from the germination of the spore through the actual penetration of the leaf tissue and to the formation of the mycelium on the surface of the leaf, the hop mildew (*Sphaerotheca humuli*) "offers the maximum resistance to the fungicide, requiring not less than double the strength which is lethal in the later stage." Two applications of ammonium polysulphide solution at the strength of 1 gallon stock solution to 99 gallons water containing 5 pounds soft soap are required to control the disease. The method of preparation of the stock solution, which is not of a kind that the growers can make for themselves, is given.—The ammonium polysulphide and soft soap wash has proved effective in controlling American gooseberry mildew and consequently may be used in place of lime-sulphur when this material interferes with the marketing of the berries.—*M. B. McKay.*

2634. Farrell J. **Apple culture in Victoria.** Jour. Dept. Agric. Victoria **17**: 287–295. *Pl. 14.* 1919.—Continuation of an earlier article. [See Bot. Absts. 3, Entry 758.] This section deals with the fungous diseases of apples and their control.—*J. J. Skinner.*

2635. Fawcett, H. S. **Psorosis (scaly bark) of orange trees in California.** California Citrograph **4**: 107, 133, 134. *5 fig.* 1919.—This serious orange disease in California manifests itself by an outer layer of bark in certain patches being broken into small irregular pieces and by these being pushed off. Several years usually elapse before the death of the infected limb. The causal organism, if such there is, has not been determined. The progress of the disease is arbitrarily divided into three stages which are described. Suggestions for treatment: first stage, aseptic excission; second stage, light scraping with application of bordeaux paste; third stage, small chance for cure, if on limb, remove; if on trunk, gouge out dead or affected wood, disinfect and paint with benzene-asphalt paint.—*J. E. Coit.*

2636. Fawcett, George L. [Rev. of: Dracopoulos, Juan N. **La gomosis de los citrus. (Citrus gummosis.)** Corrientes, 1918.] Rev. Indus. y Agric. Tucuman **8**: 153–155. 1918.

2637. Fawcett, H. S. **Citrus blast.** California Citrograph **5**: 3. *3 fig.* 1919.—A bacterial disease, due to *Bacterium citrarefaciens*, at present confined to northern California. Active only in winter and early spring. The organism destroys leaves, kills back many of the fruiting twigs and results in the formation of reddish brown scabs on the live twigs and shoots usually at and surrounding the base of each dead leaf petiole. The organism does not attack the fruit after it is set. Different varieties are differently affected, the navel orange being most injured and lemons but slightly affected. There appears to be a relationship between the following conditions and the severity of the disease:—direction of the prevailing wind, distribution of rainfall, weakness of tree from neglect, age of tree, and time of maturity of leaves and branches of the year before. A bibliography is appended.—*J. E. Coit.*

2638. Federal Horticultural Board, U. S. Dept. Agric. **Quarantine on account of flag smut and take-all diseases. Notice of quarantine No. 39 (with regulations).** Serv. and Reg. Announce. **64**: 77–79. 1919.—Also issued as an unnumbered pamphlet from the office

of the Secretary of Agriculture.—On account of the occurrence in Australia of flag smut (*Urocystis tritici*) and take-all (*Ophiobolus graminis*) and of the former disease also in India and Japan and of the latter disease also in Italy, France, Germany, Belgium, Great Britain, Ireland and Brazil, seed of the following may not be imported in the raw or uncleaned or unprocessed state into the United States from these countries: *Oryza* spp., *Triticum* spp. *Avena* spp., *Hordeum* spp., *Secale* spp. By special permission importation is allowable after inspection and disinfection at port of entry.—*D. Reddick.*

2639. Fisher, D. F. **Apple powdery mildew a serious menace to orchards.** Better Fruit 13^{10}: 3–6. *6 fig.* Apr., 1919.—Abridged from an earlier publication. [See Bot. Absts. 2, Entry 764.]

2640. Fisher, D. F. **Factors that influence diseases of apples in storage.** Better Fruit 14^{3}: 3. September, 1919.—Diseases affecting apples in storage are separated by the writer into: (1) parasitic and (2) non-parasitic or "physiological diseases." Those of the first group may be prevented either by spraying or by careful handling of the crop, depending upon the mode of attack of the causal organism. Non-parasitic diseases are influenced either by cultural or by storage conditions. Consideration is given to nutrition and irrigation as two of the main cultural factors causing physiological diseases of the fruit. Of the various forms of "physiological breakdown" due to storage conditions, scald is given detailed consideration.—Brief experimental records on irrigation investigations and on control of scald are given.—*A. E. Murneek.*

2641. Fisher, D. F., and E. J. Newcomb. **Controlling important fungous and insect enemies of the pear in the humid sections of the Pacific Northwest.** U. S. Dept. Agric. Farmers' Bull. 1056. *34 p., 18 fig.* 1919.

2642. Foex, Et. **Tubérosités du châtaignier et chancre du rosier. [Chestnut galls and rose canker.]** Bull. Soc. Path. Vég. France **6**: 68–71. May–June, 1919.—Excrescences on the chestnut, *Castanea vulgaris*, apparently of the same nature as those described by Hartig as "Holzkugeln" and "Sphaeroblastes" are reported and the morphological characteristics given. The cause is unknown.—The rose canker had *Coniothyrium fuckelii* associated with it and this is regarded as the probable cause.—*C. L. Shear.*

2643. Foex, Et. **Emission et germination des ascopores de Leptosphaeria herpotrichoides. [The discharge and germination of ascospores of Leptosphaeria herpotrichoides.]** Bull. Soc. Path. Vég. France 6: 57–61. May–June, 1919.—See Bot Absts. 4, Entry 1098; also two next following Entries, 2644, 2645.

2644. Foex, Et. **Sur le piétin du blé. [Foot rot of wheat.]** Compt. Rend. Acad. Agric. France 5: 543–548. 1919.—In the Bassin de Paris and other regions, wheat is found very frequently attacked by *Leptosphaeria herpotrichoides*, more rarely by *Ophiobolus graminis*. The former may attack one side of the plant and extend upward one or two nodes, sometimes causing the plant to bend over at or above the surface of the ground. The latter attacks the plant near or below the surface of the ground, usually girdling it. The former produces its perithecia on the stalks as early as May, but they do not have mature spores until the middle of August, the spores being set free from that time on until winter. The perithecia of the *Ophiobolus* are usually found only on the dead stubble and appear later than those of *Leptosphaeria*. *Cercosporella herpotrichoides* was also frequently found, sometimes associated with the one, and sometimes with the other fungus. Its connection could not be proved with either. The earlier the wheat is sown in the fall the more severely it is attacked. It is more severely attacked following beets than after clover or particularly after alfalfa. Sulphate of iron applied to the ground, either before planting the wheat or scattered broadcast on the snow during the winter, delays the appearance of the disease in the spring, but does not prevent its subsequent rapid spread. [See next preceding and next following Entries, 2643, 2645.]—*E. A. Bessey.*

2645. FOEX, ET. Note sur le piétin du blé. [Note on the foot disease of wheat.] Bull. Soc. Path. Vég. France 6: 52–54. May–June, 1919.—Two diseases of wheat are said to occur in France under this common name; one caused by *Leptosphaeria herpotrichoides* and the other by *Ophiobolus graminis*. The former fungus generally attacks the plant a certain distance above the soil and on one side, whereas the latter develops at the base of the culms and sometimes beneath the soil and surrounds the stems. Mature ascospores of *L. herpotrichoides* were first found August 15. From this time until May of the following year ascospores were found, thus providing material for infection of both winter and spring wheat. *Cercosporella herpotrichoides* was found associated with the Leptosphaeria and also with *Ophiobolus herpotrichus*. Its genetic connection with one or the other was suspected but not proved. Both species of *Ophiobolus* mentioned were found associated with the *Leptosphaeria* in some cases. The disease was found to attack oats as well as wheat. Spring sowing, rotation of crops especially with legumes, fertilization with nitrate of soda and sanitation are recommended for prevention. Application of 1000 kilos per hectare of iron sulphate was found very effective in preventing the disease. [See next two preceding Entries, 2643, 2644.]—*C. L. Shear.*

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2647. FROMME, F. D. The nematode disease of wheat in Virginia. Virginia Agric. Exp. Sta. Bull. 222. *12 p., 4 fig.* 1919.—This disease, caused by *Tylenchus tritici*, was first reported in Virginia in 1917, and is now known to occur in 33 counties. Distribution and severity of infection are shown by means of a table and map. The losses in a number of fields amounted to 25 per cent of the crop, and in one case exceeded 50 per cent. The greatest losses seem to occur in connection with consecutive wheat cropping. Symptoms, means of dissemination and control measures are described. In seed treatment tests it was found that a mechanical removal of galls from the seed was sufficient to insure freedom from infection from this source. This was most easily accomplished by skimming the galls off in salt brine. A close relation was found between the percentage of galls harvested and the percentage seeded. No marked differences in the susceptibility of the five varieties of wheat commonly grown in the State were found. Recommendations for control include the use of seed free from nematode galls and rotation.—*F. D. Fromme.*

2648. FUJIGURO, YOSABURO. A list of fungi on cultivated plants in Formosa. (Supplemental notes.) Bot. Mag. Tôkyô 32: (358)–(363). 1918.—A list of 100 host plants with fungi occurring on them.—*Anna E. Jenkins.*

2649. GAINES, E. F. Two important varieties of winter wheat. Washington [State] Agric. Exp. Sta. Popular Bull. 116. *7 p., 2 fig.* 1919.—See Bot. Absts. 3, Entry 1865.

2650. GALLOWAY, B. T. Giant crowngalls from the Florida Everglades. Phytopath. **9**: 207–208. *10 pl.* 1919.—Crowngalls caused by *Bacterium tumefaciens* were found on *Ficus aurea*. One weighing 97½ pounds is believed to be the largest recorded.—*F. R. Jones.*

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2668. Jensen, C. N. **Blossom infection by smuts.** Trans. Utah Acad. Sci. 1: 106–113. 1918.

2669. Johnson, M. O. **[Soil investigation.]** Hawaii Agric. Exp. Sta. Rept. 1918: 23–26. *Pl. 5.* 1919.—See Bot. Absts. 4, Entry 1663.

2670. Katsufugi, Koichi. **"Yellow dwarf," a new nematode disease of soy bean.** Ann. Phytopath. Soc. Japan 1^2: 12–16. 1919.—A disease of the soy bean (*Glycine hispida* Maxim.) called "yellow dwarf" is reported to be endemic in occurrence and of increasing importance in the vicinity of Date-mura in the Province of Iburi (the southern part of Hokkaido). The disease was first observed by Professor S. Ito in the summer of 1915, who from observations concluded that it was due to a parasitic nematode. Affected plants are yellow and dwarfed, those slightly affected producing but few seed, while badly affected plants produce no seed. From morphological and biological characters it is concluded that the cause of the disease is *Heterodera schachti*. From information at hand it is considered that the disease is confined to the southern part of Hokkaido where the winters are comparatively mild. Observations lead to the conclusion that the kidney-bean and the Azuki-bean (*Phaseolus mungo* var. *subtriolata*) are also attacked. Varieties of the soy bean, Yoshioka and Oyachi, seemed to be the most resistant, while the varieties Kotsubu and Meziro are the most susceptible. Incomplete experiments for control have given some promise from an economic standpoint.—*L. M. Massey.*

2671. Keller, G. N. **Tobacco growing in Ireland. The experiments in 1918.** Jour. Dept. Agric. Ireland 19: 298–302. 1919.—See Bot. Absts. 3, Entry 1372.

2672. Kimura, Noriyoshi. **The effect of X-ray irradiation on living carcinoma and sarcoma cells in tissue culture in vitro.** Jour. Cancer Res. 4: 95. 1919.

2673. K[irchner], O. [Rev. of: Fallada, O. **Zur Rübensamenbeize mit Schwefelsäure (On treatment of mangel seed with sulphuric acid.)** Mitt. Chem. Techn. Versuchsst. Zentralv. Rübenzuckerindust. Oesterreichs u. Ungarns Ser. IV, No. 79. Vienna. 1917.] Zeitschr. Pflanzenkrankh. 29: 55. 1919.—Since, during the war, Hitner's excellent method of treating beet seeds (fruits) with concentrated sulphuric acid could not be maintained, experiments were tried on the effect of treatment with less concentrated solutions. These indicated that sulfuric acid of 60° B. could not replace the concentrate, since the germinative energy is not nearly so stimulated as is the case with the concentrated acid. However, a method recommended by Mucha, viz.: to treat the seed in 53° acid, using a warm solution, gave commendable results, particularly after previous soaking for 6 hours in water.—*H. T. Güssow.*

2674. K[irchner], O. [Rev. of: Lüstner, G. **Ueber Ersatzmittel bei der Schädlingsbekämpfung im Weinbau. (On substitutes in the control of vine pests.)** Jahresb. Verein. Angew. Bot. 14: 87–94. 1916.] Zeitschr. Pflanzenkrankh. 29: 56. 1919.—Dusting against mildew with road dust, kaolin, gypsum, or cement is compared with the use of sulphur. Sulphur cannot under all conditions be replaced by neutral dusting compounds. Perozid may replace copper sulphate. Upsulun severely injures the green parts of grapes. Cupron appears to be effective against *Peronospora*. Bordola paste acts the same as bordeaux and perozid mixture.—*H. T. Güssow.*

2675. K[irchner], O. [Rev. of: Lüstner, G. **Die Bekämpfung der Rebkrankheiten während des Krieges. (The control of grape diseases during the war.)** Mitt. über Weinbau u. Kellerwirtschaft. 1917. No. 3.] Zeitschr. Pflanzenkrankh. 29: 57. 1919.—For the control of Oïdium, applications of sulphur, as well as so-called "war-sulphur," must be made in good time to be effective, i.e., once before and once after flowering, and later on as soon as signs of the disease are observed. Perozid mixture, prepared like bordeaux mixture, is as effective against slight attacks of *Peronospora* as the latter. *Botrytis cinerea* causes besides

rot of the grape, a stem rot and also injures leaves and shoots. The disease may be controlled by applications of nicotine soap emulsion as used against Sauerwurm (Cochylis), but being unobtainable during the war, all one could do was to provide good circulation of air in the vineyards.—*H. T. Güssow.*

2676. K[irchner], O. [Rev. of: Appel, O. **Die Blattrollkrankheit der Kartoffeln. (The leaf-roll disease of potatoes.)** Deutsche Landw. Presse 45. 1918. No. 14, with art supplement.] Zeitschr. Pflanzenkrankh. **29**: 54. 1919.—Separating all diseases previously confused with leafroll (vascular, wilt, and diseases of the base of the stem), author discusses symptoms of true leafroll disease, represented by a colored plate. The cause has not yet been determined, but change of seed should be practised as control measure.—*H. T. Güssow.*

2677. Köch, G. **Ein für Oesterreich neuer schädling auf Picea pungens. [A new disease on P. p. in Austria.]** Oesterr. Gartenzeit. **13**: 147–148. *2 fig.* 1918.—Buds curl up and are covered with black fructifications of *Cucurbitaria piceae.* Disease occurs also on *Pinus picea.* [From abst. by Matouschek in Bot. Centbl. **140**: 202. 1919.]—*D. Reddick.*

2678. Laffer, H. E. **Disease of the vine. Downy mildew (Plasmopara viticola).** Agric. Gaz. New South Wales **29**: 581–584. 1918.—The disease has appeared lately in New South Wales.—Owing to climatic conditions it is not thought that the disease will be particularly serious, the current wet season being regarded as unusual.—*D. Reddick.*

2679. Lauritzen, J. I. **The relation of temperature and humidity to infection by certain fungi.** Phytopath. **9**: 7–35. 1919.—Pathogens and host plants used were *Puccinia graminis* var. *tritici* on *Triticum sativum; Ascochyta fagopyrum* on *Fagopyrum esculentum; Colletotrichum lindemuthianum* on *Phaseolus vulgaris.* A description of a double-walled humidity and temperature infection chamber in which the temperature could be maintained within 1°.F., is given. The humidifying was accomplished by open pans of water or saturated salt solutions in combination with temperature manipulations.—*Puccinia graminis* showed a temperature range for infection of 42°–80° F.; a humidity range of 95–100 per cent relative humidity. *Ascochyta fagopyrum* showed a temperature range for infection of 45°–100° F.; a humidity range of 90–100 per cent. *Colletotrichum lindemuthianum* showed a temperature range for infection of 57–80° F.; a humidity range of 92–100 per cent.—A film of water covering the surface of the leaf is not regarded as essential for infection but plants with a dry surface show a narrower humidity range for infection.—*L. K. Bartholomew.*

2680. Ledeboer, F. **Voorloopig bericht omtrent de verbreiding der Gomziekte. [Preliminary report on the spread of gum disease.]** Arch. Suikerindust. Nederlandsch-Indië **18**: 956–961. 1919.—The spread of the disease was found to occur principally by means of the chopping knife in making the cuttings. In an extensive experiment where the knife was contaminated by first cutting diseased and thereafter healthy cane 94 per cent of the plants from the latter became diseased whereas there was only 0.3 per cent where the knife was not previously contaminated. No benefit was obtained when cuttings made with an infested knife were treated with tar or bordeaux mixture. Removal of all diseased nursery plants early in the season is recommended.—*R. D. Rands.*

2681. Lee, H. Atherton, and E. D. Merrill. **The susceptibility of a non-rutaceous host to citrus canker.** Science **49**: 499–500. May, 1919.—Citrus canker is a disease recently introduced into the gulf states from Japan. At present, attempts are being made to eradicate the disease by burning trees on which infections are found, thus eliminating the sources of new infections. The senior writer has shown that citrus canker affects plants of a number of other genera of the Rutaceae. More recently inoculations with *Pseudomonas citri* on the lansones (*Lansium domesticum*) of the Meliaceae have produced swellings which later cracked. Eruption of tissues followed. The organism was reisolated. The results of the experiment warrant the statement that *P. citri*, upon stem tissue of *Lansium domesticum*, produces a reaction not evidenced in control inoculations. It is conceivable that a chain of

circumstances in the field might produce extreme optimum conditions that would lead to infection of highly resistant host plants which, under ordinary circumstances, would be regarded as immune. Lesions on such hosts then would be capable of serving as sources of reinfection to citrus plants.—*A. H. Chivers.*

2682. Leiby, R. W. **The spraying of Irish potatoes.** North Carolina Dept. Agric. Bull. 254: 5–38. *10 fig.* 1919.—This paper contains the results of five years' (1913–1918) experimental treatment to control insects and foliage diseases of Irish potatoes in North Carolina. Yields are shown from plots receiving no treatment to prevent diseases and injury from potato beetles in comparison with those which were sprayed with Bordeaux mixture, with Bordeaux mixture to which lead arsenate was added and with plots from which beetles were removed by hand picking.—*R. A. Jehle.*

2683. Leone, G. **Il marciume radicale degli agrumi nell'Oasi di Tripoli. [A root rot of orange in Tripoli.]** Agric. Colon. Firenze 12: 209–216. *4 fig.* 1918.—The first symptoms of the disease, stunted development, slight yellowing of the foliage, abundant flowering followed by dropping of flowers and fruit, and a partial, then complete loss of leaves, do not become evident until the root rot has reached an advanced stage. Upon examination roots appear blackened, soft, and spongy, with white patches of mycelium beneath the bark. Attacked trees are usually killed, so that the trouble is a serious menace to citrus cultivation in Tripoli. It is probably due chiefly to excessive irrigation and it is therefore advised that the water supply be reduced to the minimum requirement. Use of healthy stock for grafting, and of mineral rather than organic fertilizers are also recommended.—*E. K. Cash.*

2684. Liautard. **Preparation des bouillies cupriques et cupro-arsenicales. [Preparation of copper and copper-arsenic sprays.]** Prog. Agric. et Vitic, 69: 585–590. *2 fig.* 1918.—For use in vineyards of Algeria in the control of downy mildew and insect pests.—*D. Reddick.*

2685. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. June, 1919. [Serial no. 16.]—Parasitic fungi and animals found to decrease net photosynthetic activity of leaves. [See Bot. Absts. 3, Entries 1375, 1452, 2833.]—*B. E. Livingston.*

2686. Mangin, L.—**Action nocive des émanations de l'usine de Chedde sur la végétation. [The injurious effect of gasses from the Chedde factory on vegetation.]** Bull. Soc. Path. Vég. France 5: 104–108. 1918. [Issued April, 1919.]—Injury to various trees growing in the vicinity of a munitions factory in the Alps is reported. The gasses given off contain chlorine which is said to combine with the vapor in the air, finally producing hydrochloric acid. This reaches the foliage in the dew or fog and thus causes injury. Most of the frondose trees show little or no injury except in the immediate vicinity of the factory. The aciculose trees showed most injury. *Epicea* is particularly sensitive and killed in four to six years. *Abies* and *Pinus* are also badly injured. The greater injury to such foliage is attributed to the fact that most of the fogs in the region occur in autumn, winter and early spring when the foliage has fallen from the deciduous trees.—*C. R. Shear.*

2687. Mangin, L. **Sur le dépérissement des Epicea dans la vallée de l'Arve (Chedde et Chamonix). [The death of spruces in the Arve Valley.]** Compt. Rend. Acad. Agric. France 5: 195–204. *6 fig.* 1919.—This is the full paper, of which a discussion (by Mangin, Vincey, Haller, and Henneguy) appeared elsewhere. [See Bot. Absts. 3, Entry 1179.] According to this author, beginning at the tips of the twigs the foliage turns yellow, then dies and falls off. No leaf, stem or root parasites are present. The suspicion that was expressed in the discussion, that this was due to chlorine fumes, seems unfounded since it is also present in other valleys where factories are absent. Apparently a physiological trouble, probably bearing some relation to the dryness of the soil and the altitude of the locality.—*E. A. Bessey.*

2688. MANN, HAROLD H., AND S. D. NAGPURKAR. **Notes on the "ring disease" of potato.** Agric. Jour. India 14: 388–394. 1919.—The ring disease, a bacterial wilt (organism not named), of the potato is the greatest enemy of the potato in the potato tract of the Bombay Presidency. The bacteria produce a sudden wilting of the plant and the diseased tubers show a brown ring in the vascular tissues, commencing, as a rule, near the point of attachment of the tuber to the plant, but spreading around the whole tuber. The infection occurs in the lower part of the stem in which the ring can usually be seen. Often 20 to 80 per cent of the plants in a plot die of the disease. Experiments conducted show that the disease is extremely infectious and may be spread even by the knife used in cutting the sets. The organism usually is conveyed from crop to crop through the seed and the soil. Infestation in the soil may be reduced by 75 per cent if the soil is allowed to lie idle for 2½ months and entirely disappears after 5 or 6 months. Disease free seed is the best means of eradicating this fatal disease.—*F. M. Schertz.*

2689. MASSA, C. **Una teleforacea dannosa al leccio (Stereum gausapatum Fr.). [Stereum gausapatum injurious to holm-oak.]** Ann. R. Ist. Sup. For. Naz. Firenze 3: 1–31. *2 pl., 11 fig.* 1918.—Fruiting bodies of the fungus have been observed in the vicinity of Florence on the trunks and branches of holm-oaks planted in hedges, which frequently become weakened by excessive and irregular pruning. The organism is considered a facultative parasite, occurring commonly as a saprophyte on fallen branches and on stakes and supports for hedges made from the wood of holm-oak. The injury caused to the host is serious, resulting in death if the plant is in a weakened condition. Examination of an affected trunk shows a characteristic alteration of the wood. Detailed study has been made of the organism and its relation to dead and living tissues of the host. It will be necessary to secure further confirmatory data and to obtain the characteristic pathological symptoms of the disease on healthy trees in order to prove conclusively that they are caused by the mycelium of the fungus. Suggestions for control include protection of wounds with tar, care to avoid excessive pruning, use of healthy young trees in starting hedges, and of sound wood treated to protect it from infection for posts and supports, and the removal of dead wood and diseased trees.—*E. K. Cash.*

2690. MATOUSCHEK. [Rev. of: GERTZ, O. **Makrokemiska ägghviteprof å blad. (Macrochemical tests of leaves.)** Bot. Not. 1917: 1–35.] Zeitschr. Pflanzenkrankh. 29: 51–52. 1919.—The analysis of calico or albinism in leaves showed correlation between positive albumin reaction and increase in green colour of leaves. The white portions showed no reaction. The reaction is due to the amount of chlorophyll contents increasing the albumin. In barley strains discussed by NILSSON-EHLE, which showed presence or absence of chlorophyll, the reaction was positive in the former, but negative in the latter. The investigations agree largely with the work of LAKON [Biochem. Zeitschr. 78. 1916.] on the albumin contents of albino leaves.—*H. T. Güssow.*

2691. MATOUSCHEK. [Rev. of: HEYDE, G. V. D. **Frostwirkung an Buxus sempervirens Handworthii. (Effects of frost on Buxus sempervirens Handworthii.)** Mitteil. Deutsch. Dendrol. Ges. 1917: 235–236.] Zeitschr. Pflanzenkrankh. 29: 54. 1919.—Early in 1917 there occurred in Dortmund, low temperatures ranging down to —16°C. The leaves of the above mentioned shrub were swollen to a thickness of 4.7 mm. The ice in the interior of the leaf was easily removed together with the lower leaf surface. Exposed to +10°C. this lower epidermis would easily peel away from the ice skeleton, leaving a clear impression of the leaf nervature behind.—*H. T. Güssow.*

2692. MATOUSCHEK. [Rev. of: KÜSTER, ERNST. **Ursachen und Symptome der Unterernährung bei den Pflanzen. (Causes and symptoms of malnutrition in plants.)** Naturwissenschaften 5: 665–669. 1917.] Zeitschr. Pflanzenkrankh. 29: 52–53. 1919.—Lack of nutritive salts or carbon dioxid cause malnutrition in plants. At times these substances may be available, but for some reason or other the plant is not able to make use thereof. Such reasons include: injury or parasitic attacks of the root system, anomalies in metabolism,

overhumid atmosphere, weakening through parasites. There results a reduction of the somatic mass (nanism, japanese dwarf trees, etc.). There occurs besides a reduction in the growing period, the plant hastens towards completion of its development, and often produces abundance of flowers (dwarf fruit trees), when it may eventuate in a process of "sich zum Tode blühen" [blooming itself to death]. Opposed to the above occurs reduction in organs (leaves, petals, and anthers; for instance, in poppy). Finally malnutrition may cause reduction in diversity of organs. In *Zea mais* there may occur only staminate flowers; fern prothallia produce only male sexual organs. (There occurs, so to say, spaying) On the other hand, cleistogamous flowers may develop (*Impatiens*). The struggle of the parts within an organism is really a battle for the available nutritive substances. Upon this depends the physiological malnutrition (sterility, latency of buds for decades). Malnutrition is important in the development of each single organ, as well as for the general habit of the plant. Norwithstanding physiological compulsion to permanent new production of organs, long lived plants will only reach a certain dimension, and live to an average age. When the distance from earth to crown is too long, there results a reduction in the crown—the tree ages.—*H. T. Güssow.*

2693. Matouschek. [Rev. of: Markowski, A. **Botrytis cinerea als Parasit auf Aesculus parviflora Walt. und Aesculus Hippocastanum. (Botrytis cinerea parasitic on Aesculus parviflora and Ae. Hippocastanum.)** Beitr. Biol. Pflanzen. 13. *347 p.* 1917.] Zeitschr. Pflanzenkrankh. 29: 65–66. 1919.

2694. Matouschek. [Rev. of: Neumann, O. **Absterben durch elektrischen Strom. (Dying through electrical current.)** Mitteil. Deutsch. Dendrol. Ges. 1917: 237.] Zeitschr. Pflanzenkrankh. 29: 54. 1919.—A robust linden tree at Naumburg a/S. grew in proximity to a high voltage pole. During thunderstorms in 1916 the electrical earth currents circulated through the branches towards a lightning conductor with which the pole was equipped, giving rise to audible hissing. The tree gradually died.—*H. T. Güssow.*

2695. Matouschek. [Rev. of: Rebmann. **Absterbende Schwarznüsse. (Dying of walnuts.)** Mitt. Deutsch. Dendrol. Ges. 1917: 109–114. *3 fig.*] Zeitschr. Pflanzenkrankh. 29: 53–54. 1919.—Dying and dead walnut trees occur in the forests of the Rhine near Strassburg. Author considers as cause soil conditions, water conditions, and the dense stand of trees. Suggests periodical thinning of stand by cutting over.—*H. T. Güssow.*

2696. Matouschek. [Rev. of: Rudau, Bruno. **Vergleichende Untersuchungen über die Biologie holzzerstörender Pilze. (Comparative studies on wood destroying fungi.)** Beitr. Biol. Pflanzen. *p. 375–458, 6 pl.* 1917.] Zeitschr. Pflanzenkrankh. 29: 63–64. 1919.—*Polyporus igniarius* on the following new hosts: *Ulmus campestris, Prunus cerasifera, Hippophae rhamnoides.* Forms of rots were studied on species of *Betula, Salix, Populus, Pirus,* and *Prunus.* Is a typical wound parasite.—*H. T. Güssow.*

2697. Matouschek. [Rev. of: Schwerin, Fritz, Graf v. **Blasenrost auf Pinus austriaca. (Blister rust of P. austriaca.)** Mitt. Deutsch. Dendrol. Ges. 1917: 212.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.—Record of this rust on single tree on Roman road near Epoy, Belgium, where, for large distances around, *Pinus strobus, Ribes,* or *Berberis* cannot be found. —*H. T. Güssow.*

2698. Matouschek. [Rev. of: Vadas, Eugen. **Die Monographie der Robinie mit besondrer Rücksicht auf ihre forstwirtschaftliche Bedeutung. (Monograph of Robinia with special regard to its significance in forestry.)** *xiv + 252 p. 10 art prints, 30 text fig., 14 tables.* Selmecbánya, 1914.] Zeitschr. Pflanzenkrankh. 29: 49. 1919.—The seventh section of above publication deals with the enemies of *Robinia,* and with protective measures against them. Among the vegetable parasites are mentioned *Viscum album; Nectria cinnabarina,* affecting in one case 33 per cent of plants following injury with the hoe; *Phytophthora omnivora* in seedlings; *Polyporus sulphureus,* causing a dry wood rot; *Pseudovalsa profusa* on young twigs and on leaves; *Septoria robiniae, S. curvata,* etc. Robinia is rarely injured by spring frosts. Fall frosts kill the twigs without injury to the tree.—*H. T. Güssow.*

2699. MATOUSCHEK. [Rev. of: WINGE, Ö. Stikkelsbaerdraeberen giftig? (Ist der Stachelbeermehltau giftig?) (Is gooseberry mildew poisonous?) Medd. fra foren. til Svampek. Fremme I. 108–111. 1915.] Zeitschr. Pflanzenkrankh. 29: 64. 1919.—No.—*H. T. Güssow.*

2700. MCCUBBIN, W. A. **Notes on diseases in 1918.** Agric. Gaz. Canada 6: 433–436. 1919.—Brief notes on diseases in Ontario, as follows: winter injury of apples; petiole infection of *Platanus americana* by *Gnomonia veneta;* tomato fruit rot caused by *Ascochyta* sp., *Pyropolyporus ribis* affecting red currants; *Pelargonium* affected with a vascular trouble thought to be caused by *Verticillium;* rot of cucumber fruits caused by *Rhizopus nigricans;* girdling of peach trees in the nursery attributed to *Sclerotina cinerea;* lightning injury to tomatoes; leaf spot of peach caused by *Bacterium pruni;* silver leaf of plums and peaches possibly due to mite infestation.—*D. Reddick.*

2701. MERCIER, C. A. **The electrification of seeds.** Sci. Amer. 120: 142–143. *6 fig.* 1919.—See Bot. Absts. 4, Entry 104.

2702. MERCER, W. B., AND S. P. MERCER. **Smut diseases of barley and oats.** Jour. Bd. Agric. [Great Britain] 25: 1486–1493. *3 fig.* 1919.—Popular descriptions are given with notes on the life history, prevalence in England, and treatment for control of the following smut diseases: barley, loose smut (*Ustilago nuda*), and covered smut (*Ustilago hordei*); and oats, loose smut (*Ustilago avenae*), and covered smut (*Ustilago laevis*). Brief mention is made of stinking smut (*Tilletia separata*) and leaf smut (*Urocystis occulta*) of rye.—*M. B. McKay.*

2703. MCCUBBIN, W. A. **Brown rot of stone fruits.** Agric. Gaz. Canada 6: 429–432. 1919.—A census made in 1918 in plum, peach and cherry orchards of southern Ontario of the occurrence of *Sclerotinia cinerea* and of the lesions caused by it. Apothecial clusters, varying from 1 to 111 cups per cluster, were found on a given date as follows: plum 4.1 clusters per tree; peach 5.1 clusters. At a later date clusters were found in 1 orchard to average 26.3 per tree.—Blossom infection occurred in cherries to the extent of 10.2 per cent, in plums, 6.4 per cent and peaches, 2.6 per cent.—Twigs aborted by *Exoascus deformans* were found to harbor the fungus to the extent of 76.5 per cent. Considerable significance is attached to this particularly as the conidia are developed abundantly on such twigs whereas cankers rarely bear conidia.—In the autumn the percentage of plums affected with rot was 7.9, of peaches 2.9 per cent.—The average percentage of rotten plums found on the market was 8 per cent and of peaches 8.5 per cent. Dealers reported this as "almost none."—A dusting experiment for the control of rot was without results owing to the small amount of disease present.—*D. Reddick.*

2704. MELANDER, A. L. **Dry lime-sulphur as compared to liquid.** Better Fruit 14[1]: 10. 1919.—The chemistry, value, cost, and convenience of handling of dry lime-sulphur, as compared to the liquid form, is considered in a practical way. Unless dry lime-sulphur is boiled, the liquid form is preferable.—*A. E. Murneek.*

2705. MIÈGE, EM. **La desinfection du sol. [Disinfection of soil.]** Ann. Serv. Épiph. 5: 83–144. 1918.—Extensive review of the literature of soil disinfection touching the following points: presence and persistence of animal and plant parasites and of toxins in soil, method of soil contamination, influence of disinfection on soil and parasite and on weeds. Experiments were performed at Rennes and at Paramé with a large number of antiseptics and with several different vegetables. Parasites are not named but the poor condition of untreated plots as compared with certain treated ones is attributed to the action of plant and animal parasites. Tables are presented to show the yields from the various plots. It is recognized that the chemicals employed may act as fertilizers as well as disinfectants.—Literature on accessory practices is reviewed and includes disinfection of seed, prevention of recontamination, use of resistant varieties, etc.—Theoretical considerations underlying the practice are discussed at length.—*D. Reddick.*

2706. Ministère de l'Agriculture. Rapports sommaires sur les travaux accomplis dans les laboratoires et comptes rendus des missions d'etudes. [Summaries of the entomological and pathological work accomplished and a list of projects.]—Ann. Serv. Épiph. 5: 253–272. 1918.—Pathological reports by Arnaud (Paris) and Capus (Cadillac). The latter contains notes on downy mildew and black rot of grapes, experiments with lime-sulfur solution for the control of powdery mildew (*Oidium*) of grapes, and notes on a disease of walnut caused by *Armillaria mellea*.—*D. Reddick.*

2707. Molz, E. Über die Züchtung widerstandsfähiger Rebsorten. [Breeding disease resistant grapes.] Jahrb. Deut. Landw.-Ges. 33: 166–199. 1918.

2708. Munn, M. T. Seed-borne plant diseases. Seed World, 5^{10}: 20–21. 1919.—An outline is given of the methods pursued in studying the fungous infection of seeds. The binocular microscope and the centrifuge were utilized, also, the centrifuge washing water and sediment were examined under the compound microscope for the spores or remains of fungi. Observations and tests which are cited demonstrate that many points concerning the health of the seeds can be determined in the seed laboratory. While it is not an easy matter to determine whether or not a lot of seed is free from fungous infection, the methods described were of considerable value in making the determinations.—*M. T. Munn.*

2709. Murrill, W. A. Collecting fungi in Virginia. Mycologia 11: 277–279. 1919.

2710. Müller, H. C., and E. Molz. Versuche mit Saatschutzmitteln. [Investigations with seed protectives.] Landw. Jahrb. 52: 67–130. 1918.—Investigations, covering 5 years, of the protective value of various materials for seed treatment against rodents and other animals and against smut of wheat and leaf stripe of barley and of the effect of the treatments on vitality of the seed. A large number of standard and proprietary materials were tested.—*D. Reddick.*

2711. Nash, G. V. Injury to evergreens. Jour. New York Bot. Gard. 19: 48–50; 159–164. 1918.—Winter injury.

2712. Neger, F. W. Die Blattrollkrankheit der Kartoffel. [The leafroll disease of the potato.] Zeitschr. Pflanzenkrankh. 29: 27–48. *7 fig.* 1919.—Contribution to the etiology of the disease and to the physiology of the potato plant in general, following a preliminary note in Deutsche Landw. Presse No. 76: 1918. Author discusses the translocation of starch in sound and leafroll diseased potatoes, and is of opinion that the starch accumulation in leafroll diseased leaves stands in closest relation to the degree of leafrolling. There cannot exist any doubt that starch accumulations and rolling of leaves are coincident, yet this does not prove these phenomena to be causally related; both indeed may constitute symptoms caused by a third factor, as yet unknown. Nevertheless, excess of starch may be the primary, and the rolling of the leaf the secondary factor, yet it is not clear how the former would cause the leaf to curl. The investigations continue with an inquiry into the causes of starch accumulations. It is suggested that, coincident with the excess of starch in diseased leaves, there occurs an accumulation of diastase; both factors would indicate the serious disturbance of the enzymatic processes within the plant, but as to cause and origin of which no clear vision has yet been reached. The investigations are summarized as follows: As a rule translocation of starch does nor occur readily in leafroll diseased leaves, only under optimum growth conditions a translocation occurs of the excess of starch, provided, however, that the discoloration present in the unsound leaves has not progressed too far. The ability to discharge the normal starch contents (Bildungsstärke) at comparatively low temperature (10° C.) differs in varieties, indeed often in individuals. Generally speaking, even the sound leaves of leafroll susceptible varieties discharge sluggishly these starch accumulations at a temperature of 10° C. (Important in relation to seed approval.) Translocation occurs the more readily the more vigorously the leaf is aerated. Leafroll diseased leaves contain much more diastase than sound leaves. That starch is not dissolved is apparently due to the accumu-

lation of split products of starch (Spaltungsprodukte) as sugar, through the presence of which the amylolytic enzyme is rendered inactive. In leafroll disease of other plants, especially so in lilac, the abnormal starch accumulations also occur.—*H. T. Güssow.*

2713. NEWELL, WILMON. **Citrus canker eradication in the State of Florida.** California Citrograph 4: 313, 323. 1919.—Paper read at Horticultural Convention at Riverside, Calif. May, 1919.

2714. N[OWELL], W. [Rev. of: ASHBY, S. F. **Bud-rot disease of coconuts.** Jour. Jamaica Agric. Soc. 22: 331–333. 1918.] Agric. News [Barbados] 17: 286–287. 1918.

2715. NOWELL, WILLIAM. **Root disease of coco-nut palms in Grenada.** Agric. News [Barbados] 17: 398–399, 414–415. 1918.—Thought to be caused by nematodes.—*D. Reddick.*

2716. NOWELL, W. **Investigation of the froghopper pest and disease of sugar-cane.** Agric. News [Barbados] 18: 174, 175, 190, 191, 206, 207, 222. 1919.—The author describes the condition known as blight occurring in sugar-cane fields in Trinidad. Hitherto this condition was supposed to have been brought about entirely by the attacks of the froghopper (*Tomaspis saccharina* Distant). Recently, however, C. B. WILLIAMS found from his studies of the problem that this pest could not account for all the so-called blight. It now appears from the author's co-operative work, along mycological lines, that the root disease, caused by fungi of the *Marasmius* and *Odontia* groups, is an important factor in the Trinidad problem and is causing a great deal of the damage which has been attributed to the froghopper. The nature of root disease is described, and the factors influencing it, soil conditions, remedial measures, sanitation, rotation, ratooning, manuring, etc., are fully discussed.—*J. S. Dash.*

2717. NOWELL, W. **Mycologist's report on a visit to Trinidad.** Proc. Agric. Soc. Trinidad 19: 141–159. 1919.—A discussion of the root diseases of sugar cane in connection with the injury done to the plants by the froghopper. Remedial measures suggested are better cultivation, sanitation, rotation of crops, and the selection of good seed canes.—*J. B. Rorer.*

2718. PADRÓN, ANDRÉS. **Tratamientos insecticidas y anticriptogamicos de las plantas citricas. [Spraying citrus trees.]** Revist. Agric. Com. y Trab. 2: 388–390. *2 fig.* 1919.

2719. PAMMEL, L. H. **The extermination of the common barberry to prevent crop leakage due to stem rust.** Rept. Iowa State Hortic. Soc. 53: 401–408. 1918.—Gives a brief account of barberry, its relation to stem rust of grass, *Puccinia graminis*, and the history of the movement that led up to its extermination. A comparison of the common barberry (*Berberis vulgaris*) and Japanese barberry (*B. thunbergii*).—*L. H. Pammel.*

2720. PAMMEL, L. H. **Recent literature on fungous diseases of plants.** Rept. Iowa State Hortic. Soc. 53: 185–225. 1919.

2721. PARKER, R. C. **Testing seed potatoes on Long Island.** Potato Mag. 2^3: 8, 22–23; 2^4: 19, 27–28. *1 fig.* 1919.—Considers mosaic, potash deficiency, and leaf roll.—*Donald Folsom.*

2722. PATER, B. **Bericht über das Arzneipflanzenversuchsfeld der landwirtschaftlichen Akademie in Koloszvár. [Report on the experimental field of medicinal plants of the agricultural college in K.]** Part 3. *53 p., 3 fig.* Koloszvár, 1918.—Henbane (*Hyoscyamus*) was ruined by an attack of mildew (*Erysiphe cichoriacearum*) although wild plants were slightly affected. *Ascochyta hyoscyami* caused brown leaf spots and stem lesions in 1916.—Notes on insect enemies and cultural conditions. [From abstracts by MATOUSCHEK in Zeitschr. Pflanzenkr. 29: 106–107. 1919.]—*D. Reddick.*

2723. Pavarino, L., and M. Turconi. **Sull' avvizzimento delle piante di Capsicum annuum L.** [A wilt of Capsicum annum.] Atti Ist. Bot. Univ. Pavia II, 15: 207–211. 1918.—New studies are reported on a wilt and rot disease of *Capsicum annuum* previously studied by Noelli and L. Montemartini and by the latter attributed to *Fusarium vasinfectum.* A new species of *Bacillus* (*capsici*) was isolated from affected portions of plants. The bacteria were found in newly affected portions of the plant where the *Fusarium* was not found. Successful inoculations from pure cultures were made by spraying. The *Bacillus* is described.—*F. M. Blodgett.*

2724. Pavarino, G. L. **Alcune malattie delle orchidee causate da bacteri.** [Some bacterial diseases of orchids.] Atti Ist. Bot. Univ. Pavia II, 15: 81–88. *Pl. 13.* 1918.—Bacteria were isolated from lesions on various orchids. The diseases were reproduced by subepidermal inoculation. Five new species are described as follows: *Bacterium cattleya* from *Cattleya warneri* and *C. harrisoniae; Bact. krameriani* from *Oncidium kramerianum; Bact. briosianum* from *Vanilla planifolia; Bacillus farnetianus* from *Oncidium ornithorhynchum* and *Cattleya crispa; Bacillus pollacii* from *Odontoglossum citrosmum.*—*F. M. Blodgett.*

2725. Peltier, George L. **Snapdragon rust.** Illinois Agric. Exp. Sta. Bull. 221: 535–548. *6 fig.* 1919.—Snapdragon rust, *Puccinia antirrhini,* "was reported first in this country in 1903 by Blasdale" from California. At the present time it is found practically wherever snapdragons are grown under glass. The fungus attacks seedlings, cuttings and mature plants both outdoors and in the greenhouse. It is confined to a single species of the genus, *A. majus.* All varieties of the species seem equally susceptible.—From results of experiments, the author concludes "that the fungicides used will neither prevent, check, nor control snapdragon rust in the greenhouse; it can be further concluded that by watering the soil only, in the bench, and avoiding all syringing, the disease can be held in check better than by the use of fungicides."—Rust is not carried by snapdragon seed, though the lattter be taken from infected seed pods. The disease can, therefore, be eliminated by the propagation of plants from seed.—*P. A. Lehenbauer.*

2726. Peltier George L. **Carnation stem rot and its control.** Illinois Agric. Exp. Sta. Bull. 223: 579–607. *5 fig.* 1919.—The symptoms, cause and control measures of carnation stem rot. The disease, caused by *Rhizoctonia solani* (*Corticium vagum*), is responsible for an annual average loss of carnation plants of 2.2 per cent in the greenhouse and 3.25 per cent in the field. Manures, commercial fertilizers and acidity or alkalinity of soil have little influence on growth of fungus. Soil disinfectants such as sulfuric acid, formalin, bordeaux, and copper sulfate are of little value in the control of the disease. Steam sterilization will eradicate the fungus from soil, but upon transplanting carnation plants from field into benches containing sterilized soil the fungus may be again introduced. The disease follows closely temperature and moisture conditions and infection seems to be controlled primarily by the existing soil temperature. Since the optimum temperature for the growth of carnation plants is relatively low (50° to 62° F.) and the optimum temperature for the growth of the fungus relatively high (approximately 86° F.) control measures lie in "a careful watch of the growing conditions of the plants."—*P. A. Lehenbauer.*

2727. Pethybridge, G. H. **Investigations on potato diseases.** Jour. Dept. Agric. Ireland 19: 271–292. *2 fig.* 1919.—Discusses the 1918 Ireland crop of potatoes (*Solanum tuberosum*) with special regard to blight (*Phytophthora infestans*) and fertilizer malnutrition. One per cent and 2 per cent Burgundy mixtures have proved of equal value for the control of blight: four applications are profitable; their effect upon yields of resistant varieties varies; they are better when the stronger forms of sodium carbonate are used. Some varieties are resistant to blight but none, so far, to pink rot (*Phytophthora erythroseptica*). Disinfection with mercuric chloride, formaldehyde, and heat, effective against silver scurf (*Spondylocladium atrovirens*) killed the tubers, the first agent also spotting them at the lenticels. Heating tubers did not produce leaf roll (organism unknown). Pit-rot has been found in Ireland since 1909 and in England on tubers from storage pits, being characterized by hemispheres

of dead tissue. These appear externally as dark pits from 0.3 to 2.5 cm. in diameter and with a lenticel or eye in the center. As they become drier and harder they change from brown to blackish gray. Further description is given together with results indicating that a toxic gas or liquid is the cause.—*Donald Folsom.*

2728. PETRI, L. **Studi sulla malattia del castagno detta "dell'inchiostro." Morfologia e biologia del micelio parassita. [Morphology and biology of the organisms causing the ink disease of chestnut.]** Ann. R. Ist. Sup. For. Naz. Firenze 3: 151–185. *4 pl., 16 fig.* 1918.—The causal organism (*Blepharospora cambivora*) is classified in the order Saprolegniae. The production of spores occurs in nature only in the water moistening the humus around the roots of the trees, while cultures were found to fruit in dilute solutions of nutritive mineral salts. Formation of oospores has been observed only in infected tissues of germinating seedlings. The disease is carried from one tree to another in the same grove by means of rains and streams washing the soil, but may be disseminated to a great distance through oospores carried by the wind. Artificial inoculation clearly demonstrates the parasitic nature of the disease, showing that the organism can attack the roots and the basal portion of the trunk of trees in all stages of growth. The relative ease with which the mycelium of the fungus attacks the living tissues of chestnut indicates that conditions predisposing the tree toward infection may be regarded as negligible. Humidity and mild temperature in winter and spring are the principal conditions favorable to the appearance of the disease.—*E. K. Cash.*

2729. POLE EVANS, I. B. **[Report of the] Division of botany.** Rept. Dept. Agric. Union South Africa 1917–18: 61–68. 1918.—Pathological report (p. 65–68) deals with the organization work for the eradication of citrus canker.—Brief statement of the problems under investigation by members of the staff.—*D. Reddick.*

2730. PRUNET, A. **Le black-rot et son traitement. [Black rot of grape and its control.]** Prog. Agric. et Vitic. 69: 533–545. 1918.

2731. RAMÍREZ, ROMÁN. **Enfermedad grave de la caña. [Serious disease of sugar cane.]** Revista Agric. [Mexico] 4: 348–349. *2 fig.* 1919.—*Thielaviopsis paradoxa* (black rot or pineapple disease) reported as causing loss in Yellow Caledonia cane in Mexico.—*John A. Stevenson.*

2732. RANDS, R. D. **De bruine binnenbastziekte van Hevea brasiliensis. (Voorloopige mededeeling.) [The brown bast disease of Hevea brasiliensis.]** Arch. Rubbercult. Ned.-Ind. 3: 156–159. 1919.—In this disease a brownish gum is found in the diseased tissue in the intercellular spaces between the parenchyma, sieve tubes, or latex vessels of the bark. In severe cases it is also found in latex vessels near the cambium. By its behavior toward oxidizing agents and its staining reactions it is shown to be one of those gums that serve the purpose of "wound stoppage." No causative organism present but experiments show that the *Hevea* tree responds to most wounds extending to or near the cambium by the secretion of the brown gum. It appears therefore that brown bast is an accentuated condition of gum secretion probably resulting from the response on the part of the tree to the present methods of tapping.—*W. E. Cake.*

2733. RAVAZ, L. **Nouveau essais de traitement contre le mildiou. [Recent studies on grape downy mildew control.]** Prog. Agric. et Vitic. 69: 313–315, 361–363. 1918.

2734. RAVAZ, L. **Ce qu'il faut connaitre du mildiou. Regles a suivre pour le combattre. [Downy mildew of grapes and its control.]** Prog. Agric. et Vitic. 69: 457–468. 1918.

2735. REDDICK, DONALD, AND STEWART, V. B. **Additional varieties of beans susceptible to mosaic.** Phytopath. 9: 149–152. 1919.—In addition to tests mentioned in Phytopath. 8: 530–534, 1918 the following varieties have been tested in the field and found susceptible: *Phaseolus vulgaris*, black-eyed wax, and 25 other varieties; *Phaseolus lunatus macrocarpus*, long pod; *Phaseolus acutifolius latifolius*, Tepary; *Vicia faba*, horse bean, and winter horse

bean. Eight Manchurean beans were also found susceptible. No mosaic developed in any plots of variety Robust. The following varieties and related species are immune or highly resistant to mosaic: *Dolichos lablab*, hyacinth; *Cicer arietinum* Garbanzo; *Vigna sinensis*, black-eye; *P. aconitifolius*, moth bean; *P. aureus*, Mung bean; *Canavali ensiformis*, Jack bean. These may be used for breeding resistant varieties.—*R. E. Vaughan.*

2736. Reimer, F. C. **A new and effective disinfectant for pear blight.** Better Fruit 13^{10}: 24–27. Apr., 1919. [Also published in: Monthly Bull. State Comm. Hortic. (California) 7: 562–565. 1918. (See Bot. Absts. 2, Entry 535.)]

2737. Reinking, Otto. **Philippine plant diseases.** Phytopath. **9**: 114–140. 1919.—The author has made a survey of fungous diseases on the island of Luzon (Philippine Islands). Climatic conditions are especially favorable for the development of fungous pests and the native farmers are ignorant of control measures. The coffee industry has been entirely wiped out by a disease; coconut, rice, sugar, and citrus industries are also hampered and the culture of all vegetables complicated by various diseases. The estimated loss averages about 10 per cent for all crops.—A list of 48 of the principal cultivated and wild hosts of the Launa Province. Luzon, is given, together with the relative importance of the crop and the names of the diseases which are destructive to them. A short description of each disease is given, together with the name of the causal organism. Many of these organisms have never been described, but the more common hosts are attacked by those parasites which are prevalent upon them in other countries. The citrus trees are attacked by canker (*Bacterium citri*), die-back, and gummosis, coconuts suffer most from bud rot (cause not determined), leaf spots, and sooty mold, while the most destructive coffee disease is rust (*Hemileia vastatrix*). On the tomatoes are found bacterial wilt (*Bacillus solanacerum*), late blight (*Phytophthora infestans*) and damping off (*Pythium de baryanum*).—Bacterial diseases seem particularly severe, especially bacterial wilt of potato, egg plant and tomato and bacterial blight of beans. —*Maude Miller.*

2738. Rhoads, Arthur S. **The biology of Polyporus pargamenus Fries.** New York State Coll. Forestry Tech. Publ. 11. *197 p., 31 pl., 6 fig.* 1918.—See Bot. Absts. 3, Entry 2497.

2739. Rodda, T. E. **Brown rot experiment at Arataki.** Jour. Agric. [New Zealand] 16: 222–228. 1918.—Spraying experiment, fractional in part, but also designed to test relative value of a number of fungicides. Some trees sprayed four times showed a higher percentage of rot than the unsprayed ones. "The weight of evidence is in favor of the sulfur compounds."—Similar trials on apricots showed that Bordeaux mixture gave the best control of rot but because of discoloration of fruit should give way to lime-sulfur solution 1: 130. —Rust was controlled satisfactorily by all the fungicides used.—*D. Reddick.*

2740. Rodda, T. E. **Control of red mite and black-spot.** New Zealand Jour. Agric. **18**: 344–347. *Pl. 1.* 1919.—Oil, 1: 30, used when buds were in advanced pink stage was very effective against red mite. Bordeaux, 6: 4: 50, was much better than lime-sulphur solution for the control of black spot, *Venturia inaequalis*, but caused considerable fruit russeting and is therefore not recommended. Oil was used on the same trees as the Bordeaux.—*N. J. Giddings.*

2741. Rose, D. H. **Blister canker of apple trees: a physiological and chemical study.** Bot. Gaz. 67: 105–146. Feb., 1919.—See Bot. Absts. 4, Entry 1546.

2742. Rosen, H. R. **A bacterial root-rot of field corn.** Arkansas Agric. Exp. Sta. Bull. 162. *12 p. 4 pl.* Aug., 1919.—The author describes a serious root-rot disease of field corn, considered identical with that studied by Burrill in Illinois in 1889. A bacterium was isolated from the diseased tissues, inoculated on healthy plants and reisolated from the diseased roots resulting. It is noted that the organism produces lesions on sorghum identical with those produced by the sorghum organism, *Bacillus sorghi*. The organism is not described further than to note that it is motile by one polar flagellum.—*John A. Elliott.*

2743. Royal Institute of Public Health. **The bacteriological testing of disinfectants.** Jour. State Med., London, 27: 2. 1919.

2744. Rutgers, A. A. L. **Bastziekten in de F. M. S. [Bark diseases of Hevea brasiliensis in the Federated Malay States.]** Arch. Rubbercult. Nederlandsche-Indie 2: 57–59. 1918.—Review of articles on stripe canker and brown bast disease in the Malayan Tin and Rubber Journal for August, September, and October, 1917. The brown bast disease of *Hevea* is definitely identified by Rutgers with the condition which he described as "bruine binnenbast" in connection with canker phenomena. By H. C. Pratt it is considered probable that the disease is caused by *Phytophthora*. Belgrave reported that no *Phytophthora* was found in specimens of *Hevea* suffering from "brown bast" or "water-logged bark," or in burred trees, but that a member of the Plasmidiophoraceae, apparently a new species of *Spongospora*, was present, and that there was little doubt that it was the cause of the disease, although inoculation experiments had not been performed.—*H. H. Bartlett.*

2745. Rutgers, A. A. L. **Voorschriften voor de bestrijding van bastziekten bij Hevea (uitgegeven door het Algemeen Proefstation der Avros, October 1917). [Instructions for the combating of bark diseases in Hevea.]** Arch. Rubbercult. Nederlandsche-Indie 2: 55–57. 1918.—Abstract in Dutch and English of a circular on the treatment of stripe canker (black thread disease), patch canker, brown bast disease, and burrs, issued by the General Experimental Station of the A. V. R. O. S. to the members of the association of rubber planters of the East Coast of Sumatra.—*H. H. Bartlett.*

2746. Salmon, E. S., and H. Wormald. **Potato spraying experiments at Wye College Fruit Experiment Station, East Milling, Kent.** Jour. Bd. Agric. Great Britain 26: 71–77. *1 fig.* 1919.—A series of field experiments was carried out in 1918 with "British Queen," a second-early variety of potatoes to determine the value of spraying such a variety. One application of Bordeaux or Burgundy mixture resulted in loss, owing to the spraying lengthening the period of ripening while not protecting the crop from attacks of blight (*Phytophthora infestans*). Under the same seasonal conditions, two sprayings with either Bordeaux or burgundy mixture resulted in an increase of 2.37 tons and 1.5 tons, respectively, of sound tubers per acre. [See also next following Entry, 2747.]—*M. B. McKay.*

2747. Salmon, E. S., and H. Wormald. **Potato-spraying experiments at Wye College, 1918.** Jour. Bd. Agric. Great Britain 26: 269–278. *2 fig.* 1919.—Tests were conducted to compare the relative efficiency of two and three applications of Burgundy mixture on Great Scot potatoes for controlling late blight (*Phytophthora infestans*). Also plots were sprayed with Bordeaux mixture and a new copper-containing mixture in which sodium silicate replaced the washing soda.—The Burgundy and sodium-silicate-Bordeaux mixtures both produced scorching which killed or injured many of the leaves so the fungicidal action was difficult to judge. The best results were obtained on the plots sprayed three times with 1.4 per cent Bordeaux mixture, which caused no scorching, the increase being at the rate of 2 tons 9 cwt. per acre. [See also next preceding Entry, 2746.]—*M. B. McKay.*

2748. Savage, William G. **Disinfection: its place and application in public health work.** Jour. R. Sanit. Inst. London 39: 54–61. 1918.

2749. Scalia, G. **Sull' Ascochyta pisi Lib. [On Ascochyta pisi.]** Staz. Sper. Agric. Ital. 51: 228–242. *8 pl., 3 fig.* 1918.—See Bot. Absts. 4, Entry 1158.

2750. Schamberg, Jay F., John A. Kolmer, George W. Raiziss, with the assistance of Mary E. Trist. **Sodium oxy-mercury-ortho-nitro phenolate (mercurophen), with special reference to its practical value as a disinfectant.** Jour. Infect. Dis. 24: 547–582. 1919.—See Bot. Absts. 3, Entry 830.

2751. Schander, R. Beobachtungen und Versuche über Kartoffeln und Kartoffelkrankheiten im Sommer 1917. [Observations and investigations of potato diseases in 1917.] Fühling's Landw. Zeit. 67: 204–226. 1918.—Numerous tubers of the varieties Atlanta and Kaiserkrone were attached by *Phytophthora infestans* although stems and leaves were free.—Author thinks late blight control should be sought primarily in development of disease resistant varieties. [From abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 118–119. 1919.]—*D. Reddick.*

2752. Schoyen, T. H. Beretning om skadeinsekter og plantesygdommer i landog havebruket 1917. [Report on insects and diseases of field and garden crops in 1917.] Aarber. Landbr. Dept. [Norway] 1917: 29–101. 1918.—Brown leaf-spot of barley (*Pleospora teres*) was very abundant on account of wet weather.—Potato wart (*Synchitrium endobioticum*) has appeared in increasing abundance and regulatory mandates must be issued.—Gooseberry mildew (*S. mors-uvae*) continues to spread. It occurs on black currant but rarely winters on this host.—Rose mildew (*Sphaerotheca pannosa*) was not controlled by spraying with 0.4 per cent formaldehyde solution.—The disease caused by *Exobasidium azaleae* can not be controlled by use of lime-sulfur solution. The affected leaves must be picked off before the fungus sporulates.—[From abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 107–108. 1919.]—*D. Reddick.*

2753. Schwartz, M. Ueber die Nachtschneckenplage 1916 in Nordfrankreich. [Plague of slugs in northern France in 1916.] Zeitschr. Pflanzenkrankh. 29: 81–84. 1919.

2754. Schoevers, T. H. C. De tomatenkanker, een voor Nederland ernstige tomatenziekte. [Tomato canker: a serious disease in Holland.] Tijdschr. Plantenz. 25: 174–192. *Pl. 3–5.* 1919.—A canker disease of the stalks of tomatoes occurring both in the greenhouse and in the field is described. Fruits are also affected especially about the stem end, inducing a rot which causes them to drop. No lesions on leaves or petioles were discovered. A girdling followed by a wilting of the parts above the stalk lesion is the most striking symptom. Pycnidia of a species of *Ascochyta* develop abundantly on the cankered areas. This fungus was obtained in pure culture and its causal relation established by controlled infection experiments. Although the author obtained no perfect stage of the parasite, he believes it to be identical with *Ascochyta citrullina* the perfect stage of which is known to be *Mycosphaerella citrullina.* The pathogene which has been destructive the past two seasons appears to be widely distributed in Holland. It seems to have been but recently introduced, probably from England. This disease may be mistaken for the wilt due to *Verticillium alboatrum* or for the root rot caused by *Rhizoctonia solani* but is readily distinguished from either of these upon critical examination of the symptoms. No satisfactory method of control has been discovered. Sanitary measures are recommended.—*H. H. Whetzel.*

2755. Schultz, E. S., Donald Folsom, F. Merrill Hildebrandt, and Lon A. Hawkins. Investigations on the mosaic disease of the Irish potato. Jour. Agric. Res. 17: 247–273. *Pl. A, B and 25–30.* 1919.—Mosaic is widely distributed in the United States. Characteristic symptoms, which appear on aerial parts only, may be modified or obscured by differences in environment or of variety. Tubers of diseased plants transmit the disease. It is also transmitted by diseased scions in grafting, by transfer of expressed juice from a diseased to a healthy plant, and by at least 2 sucking insects, *Myzus persicae* and *Macrosiphum solanifolii.*—Foliage of mosaic plants show a higher sugar content and lower starch content than that from healthy plants.—Tubers from plants showing mosaic may develop plants free from the disease, or the progeny may show no ill effects of the disease, or, not uncommonly, the yield is considerably decreased.—Hill selection alone is not a satisfactory means of control because plants may become affected late in the season and show no symptoms of the disease although the progeny shows that infection occurred.—Roguing out diseased plants before the appearance of mosaic transmitting insects has been found efficient in checking the spread of the disease.—*D. Reddick.*

2756. STAKMAN, E. C. The black stem rust and the barberry. U. S. Dept. Agric. Yearbook 1918: 75–101. *14 pl. (2 colored), 38 fig.* 1919.—Damage caused by rust is enormous. It is a limiting factor in some localities. A list of the common rusts is given with methods of telling them apart, illustrated by colored plates. A very considerable number of species of grasses are attacked. The black stem rust (*Puccinia graminis*) has many forms which are specific in attack. The life history of the rust is given in detail, illustrated. The rust on seeds does not infect young sprouting grain. The summer spores (uredospores) can not winter except in the gulf states and in California. There is no migration from these regions north. Rust damage can be reduced by proper soil management, early sowing, seeding with resistant varieties of grains, destruction of rusting grasses, and eradication of barberry.—The importance of the role of barberry was shown by tracing infection of grains to bushes located from eighty rods to a mile or more away, so that barberry bushes located in towns may be the cause of a severe rust in the surrounding country. A discussion of the various varieties of barberries and their relation to rust is given. Of the numerous species, two types of barberry are distinguishable, those that resemble *Berberis vulgaris* which carry rust and those resembling *Berberis thunbergii* which do not carry rust.—Denmark has solved the rust problem by eradicating the barberry. A history of barberry laws is given. Sentiment for eradication of barberry is increasing and should be fostered.—*C. J. Shirk.*

2757. SEVERENCE, GEORGE. Twenty-eighth annual report for the year ending June 30, 1918. Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—See Bot. Absts. 3, Entry 1882.

2758. SEVERIN, H. H. P. Investigations of the beet leafhopper (Eutettix tenella Baker) in California. Jour. Econ. Entomol. 12: 312–326. *Pl. 15.* 1919.—The source of the beet leafhopper in the spring, its hibernation through fall and winter, native plants from which it transmits leaf curl to beets (*Beta vulgaris*) and related cultivated plants, life history and related topics are discussed. The hoppers leave the native vegetation in the spring for the more succulent plants of the cultivated fields and return to the native plants in the fall. This fact has important bearing on the time of planting sugar beets. Beets planted in November, December and January in San Joaquin Valley, conditions being favorable, usually produce good crops, though with an increase in number of plants producing seed stalks (with lower sugar content) early, and tougher roots. The young plants are sometimes killed by frost when planted early.—The disease was transmitted to sugar beets from the following plants by transferring hoppers: *Atriplex elegans, A. semibaccata, Sessuvium sessile, Larrea divaricata* and *Erodium cicutarium;* Bur clover (*Medicago hispida*) developed curly leaf when attacked by beet leafhopper from *Erodium cicutarium*, bur clover, and grass. Non-virulent adults reared from eggs and kept on black mustard (*Brassica nigra*) failed to transmit the leaf curl to beets when allowed to feed previously on cresote bush (*Larrea divaricata*), obtained from the Mojave desert and Imperial Valley; a non-virulent hopper transmitted the disease to beets when allowed to feed previously on lowland purslane (*Sessuvium sessile*) collected at Niland, but two failed to transmit the disease when fed on purslane from "Dixieland."—Leafhoppers "bred" from the following plants transmitted curly leaf to beets: *Atriplex rosea, A. expansa, Salsola kali*, var. *tenuifolia, Amaranthus retroflexus, Am. graecizans, Am. deflexus, Sessuvium sessile, Brassica arvensis* and *Solanum nigrum* var. *douglasii.*—A study of the seasonal migrations of the leafhoppers from native plants in the spring to cultivated beets and return to native vegetation in the fall, suggests a cycle of plants which harbor the disease —*A. B. Massey.*

2759. SHAPOVALOV, M. Some potential parasites of the potato tuber. Phytopath. 9: 36–42. *Pl. 2–3, fig. 1–2.* 1919.—Potato tubers of the Irish cobbler variety were inoculated with the mycelium of pure cultures of *Penicillium oxalicum*, Currie and Thom, *Aspergillus niger* Van Tiegh., and *Clonostachys araucaria* var. *rosea* Preuss. and rots resulted which progressed quite as rapidly as did those produced in tubers by *Fusarium radicicola.* The author considers these organisms to be potential parasites which should be given some serious consideration because of the possibility of their becoming progressively more parasitic.—*Maude Miller.*

2760. Shepherd, J. F. **Spraying tests at Te Kauwhata.** Jour. Agric. [New Zealand] **16:** 228–230. 1918.—Various modified Bordeaux mixtures were tested on dormant pear trees for the control of scab (*Venturia pirina*). None decreased the amount of scab.—Later treatments with Bordeaux mixture gave excellent control. Pickering's Bordeaux was not effective nor was lime-sulfur solution at the strength at which it can be used with safety (1:80).—Lime-sulfur solution (1:100 or weaker) and atomic sulfur (about 1:10) gave equally satisfactory control of apple mildew.—*D. Reddick.*

2761. Silberschmidt, W. **Kritik unserer Anschauungen über Desinfektion und Desinfektions-Mittel. [A criticism of our views concerning disinfection and disinfectants.]** Correspondenzbl. Schweiz. Aerzte **49:** 593–600. 1919.

2762. Small, W. **Annual report of the Government botanist 1917–18.** Ann. Rept. Dept. Agric. Uganda Protectorate 1917–18: 52. 1918.—Brief account of most prevalent plant diseases on coffee, cacao, and *Hevea* during the year.—*Anna E. Jenkins.*

2763. Smith, Annie Lorrain. **Hyphomycetes and the rotting of timber.** Trans. British Mycol. Soc. **6:** 54–55. 1918.—In addition to *Merulius lacrymans*, the author reports two hyphomycetes found attacking timbers in houses. *Torula abbreviata* Cda. was isolated from dark speckles in wood from portion of beam from modern house in Surrey. Fructifications of a *Haplographium* resembling most nearly *Haplographium finitimum* Sacc. were found in darkened disintegrated portions of beam from old house in Suffolk.—*Anna E. Jenkins.*

2764. Smith, J. W. **The effect of weather upon the yield of potatoes.** Potato Mag. 1^{10}: 11–14, 32; 1^{11}: 15–17; 1^{12}: 7, 16–17, 27; 2^{1}: 16–17, 33–34. *Fig. 1–23.* 1919.—See Bot. Absts. 3, Entry 1886.

2765. Soursac, L. **Maladies du prunier. [Plum diseases.]** Prog. Agric. et. Vitic. **69:** 180–185. 1918.

2766. Stakman, E. C., H. K. Hayes, Olaf S. Aamodt, and J. G. Leach. **Controlling flax wilt by seed selection.** Jour. Amer. Soc. Agron. **2:** 291–298. *Pl. 9.* 1919.—The authors report the results of four years of selection of flax which is resistant on "flax-sick" soil (soil infested with *Fusarium lini*). Experiments conducted at Waseca and University Farm, Minnesota, have given good results by the bulk method of selection and it has been shown that by careful selection a good crop of flax may be produced on heavily infested soil.—*F. M Schertz.*

2767. Stewart, F. C. **Notes on New York plant diseases, II.** New York Agric. Exp. Sta. [Geneva] Bull. **463:** 157–188. *Pl. 1–8.* 1919.—A collection of short notes on diseases of cultivated plants, *viz.*, diseases caused by *Peronospora trifoliorum*, *Ascochyta imperfecta*, and *Pyrenopeziza medicaginis* on alfalfa; *Leptosphaeria coniothyrium* on apple; *Bacillus carotovorus* on carrot and *Amorphophallus simlense; Gnomonia leptostyla* and *Microstroma juglandis* on butternut; *Phoma lingam* and a sclerotial fungus on cabbage; *Sclerotinia libertiana* on carrot; *Cecidomyia catalpae* on catalpa; *Sclerotinia cinerea* on sand cherry; *Fomes applanatus* and *Coccomyces hiemalis* on cherry; *Gloeosporium caulivorum*, *Pseudopeziza trifolii*, *Rhizoctonia* sp., and *Cercospora* sp. on clover; *Pythium debaryanum* on cucumber; *Pseudopeziza ribis*, *Cercospora angulata*, *Fomes ribis*, *Sphaerotheca mors-uvae*, *Hypholoma perplexum*, and *Botrytis* sp. on currant; and *Mycosphaerella ulmi* on elm: also, diseases of non-parasitic or undetermined origin, *viz.*, fruit-pit and stem-constriction disease of apple; stem-and-root disease of apples and pears; black leaf-speck of cabbage; winter injury of cherry; yellow leaf of cherry and elm; crinkle leaf, fruit drop, sunburn, tipburn, imperfect buds, and witches' broom on currant; and trunk injury and a branch disease of elm.—*F. C. Stewart.*

2768. Stift, Anton. **Bemerkenswerte Mitteilungen über das Auftreten von tierschen Feinden und Krankheiten der Zuckerrübe in Jahre 1917. B. Krankheit der Zuckerrübe. [Noteworthy information on the animal enemies and diseases of sugar beets in 1917.** [Blätter

Zuckerrübenbau 25: 43–45. 1918.—A general résumé is given of literature on the troubles of sugar beets in Austrian territories in 1917.—Úzel reports a Bohemian beet disease which has been spreading steadily through the growing season. The characteristics of the disease are sickly-looking leaves and loss of side roots, sometimes even the main root falling off. Adventitious roots appear giving the root an irregular shape. The trouble possibly is caused by methods of fertilization or drainage, irrational rotation of crops or use of land not suited to beet culture. Remedy suggested is the use of seed from sound beets as this disease may be transmitted through the seed. A report is given of Austrian seed disinfection experiments during the year. Bacterial troubles are reported.—*Caroline Rumbold.*

2769. Tanner, Fred W., and Ruth S. Funk. **Some observations on the use of boric acid as a disinfectant.** Amer. Jour. Pharm. 91: 206–210. 1919.—As a result of a short study of boric acid as a disinfectant, the authors arrive at the conclusion that boric acid should not be employed in cases where a disinfectant is absolutely essential. The experiments consisted of adding increased amounts of a saturated solution of boric acid to tubes inoculated with various types of bacteria. The silk thread method was also employed.—*Anton Hogstad, Jr.*

2770. Taylor, E. P. **Uniformity of rules and regulations of potato seed certification.** Potato Mag. 2²: 7, 21–23. *1 fig.* 1919.

2771. Tisdale, W. H. **Report of the division of plant pathology and bacteriology.** North Carolina Agric. Exp. Sta. Ann. Rept. 41: 58–59. [1919.]—A brief report of work by Wolf on tobacco wildfire, trembles and milksickness, intumescences on cabbage, and bacterial blight of the soybean.—*R. A. Jehle.*

2772. Townsend, C. O. **An immune variety of sugar cane.** Science 49: 470–472. May, 1919.—F. S. Earle noted that among about twenty varieties of cane growing at the federal station at Mayaguez, Porto Rico, there was one variety, *Kavangire*, free from the mottling disease (mosaic). Tests were made with ninety varieties of cane, the first planting being made on Oct. 1, 1918. Ten weeks later all varieties showed infection with the exception of Kavangire, and this variety was still uninfected at the time of writing (March, 1919). Earle raises the question as to whether or not Kavangire can be successfully used for general planting in Porto Rico. If it can, and retains its immune characteristics, the question of combating the mottling disease is solved.—*A. H. Chivers.*

2773. Turconi, Malusio, and Luigi Maffei. **Note micologiche e fitopatologiche. I.—Un nuovo genere di Ceratostomataceae. II.—Due nuovi micromiceti parassiti della Sophora japonica Linn. [Mycological and pathological notes.]** Atti Ist. Bot. Univ. Pavia II, 15: 143–149. *Pl. 1.* 1918.—To the family *Ceratostomataceae* is added a new genus, *Chaetoceratostoma* represented by *C. hispidum* found on dead leaves of *Castanea vesca* in Liguria.—A new species *Macrosporium sophorae* which causes a spotting of leaves of *Sophora japonica* is described. Also *Gibberella briosiana* which causes a white canker on the stems of *Sophora japonica.* Successful inoculations were made with spores and affected tissue in the case of the last-named fungus.—*F. M. Blodgett.*

2774. Úzel, H. **Über Krankheiten und Schädiger der Samenrübe in Böhmen in den Jahren 1916 und 1917. [The diseases and enemies of seed beets in Bohemia in 1916 and 1917.]** Blätt. Zucherrübenbau 25: 187–192. 1918.—In 1916 seed beets were infested with black aphis (schwarzen Blattlaus). There was much complaint about the birds: lark, titmous, siskin and especially sparrow, stripping the seed stalks of seed when they were half ripe. Damping-off fungi affected the roots, and leaf troubles were caused by *Sporodesmium putrefaciens, Cladosporium herbarum* and bacteria.—In 1917 there was an outbreak of black aphis on both field and seed beets, and some green aphis; field mice caused much loss. A warning is given to choose for seed only those seed beets which show resistance to nematode attacks. Bacteria caused much rotting of the roots in the earth. Very little *Cerospora* was seen due to the dry weather.—*Caroline Rumbold.*

2775. Üzel, H. Berichte über Krankheiten und Feinde der Zucherrübe in Böhmen und der mit derselben abwechselnd kultivierten Pflanzen im Jahre 1916. [Report on diseases and enemies of sugar beets and their accompanying crops in Bohemia in 1916.] Blätt. Zuckerrübenbau 25: 175–179. 1918.—The greatest loss was caused by beet nematodes, next in degree came the damping-off fungi. He reports also *Sporodesmium putrefaciens, Phyllosticta betae, Cladosporium herbarum, Cercospora beticola* and *Uromyces betae.* Black aphis, beet beetles and wire worms are reported. Field mice and musk rats damaged the crops.—*Caroline Rumbold.*

2776. Üzel, H. Aus der phytopathologischen Abteilung der Versuchstation für Zuckerindustrie in Prag. [Report of the phytopathological division of the experiment station for the sugar industry in Prag.] Blätt. Zuckerrübenbau 25: 163–164. 1918.—The sugar beet crop was extremely good. There was some leaf spot (*Cercospora beticola*). A warning is given that all beet leaves should be cleared from the fields after harvest. Plants infected with leaf spot should not be used as mother beets because the seed may carry spores. Suspicious seed should be disinfected. Beets showing heart rot should not be used as mother beets since such seed may have a tendency to heart rot. All siloed beets should be packed, if possible with "Sulfin" or at least with powdered lime.—*Caroline Rumbold.*

2777. Van der Bijl, Paul A. Observations on a fungus—Cephalosporium sacchari Butler—which causes a red rot of sugar-cane stems. Union of South Africa Dept. Agric. Sci. Bull. 11. 1919.—A red rot of sugar cane occurring in Natal is caused by the fungus *Cephalosporium sacchari* Butler. This disease has been previously recorded from India, Barbados, Trinidad and Leeward Islands. Infection experiments proved the pathogenicity of the fungus which appears to be of the nature of a weak parasite, and spreads slowly through the cane stalks. It is suggested that although the fungus does not produce spores on growing cane these may be liberated in abundance from decaying stalks, and that possibly some of the caneleaf spots may be due to this fungus. The following control measures are suggested: (1) the destruction of infected cane, (2) the avoidance of infected cane when taking sets for planting.—*E. M. Doidge.*

2778. Van der Bijl, P. A. A ripe rot of paw-paws. South African Fruit Grower 6: 177. *4 fig.* 1919.—The disease occurs commonly along the Natal coast, but the causal fungus has not been identified. Removal of dead leaf stalks and spraying with Bordeaux mixture are recommended as control measures.—*E. M. Doidge.*

2779. Van der Broek, M., and P. J. Schenk. Zeikten en Beschadigingen der Tuinbouwgewasse. [Diseases and enemies of garden plants.] 2 ed. J. B. Wolter: Groningen, 1918.

2780. Van Houten, J. M. The fatality of crown gall in apple orchards. Better Fruit 14^4: 9. October, 1919.—A condensed popular review of Iowa Agric. Exp. Sta. Research Bull. 50.—*A. E. Murneek.*

2781. Veall, J. J. Black spot of pear. An orchardist's control experience. Jour. Agric. [New Zealand] 16: 288–290. *1 fig.* 1918.

2782. Vincent, C. C. Lime-sulphur summer spray for apple scab. Better Fruit 13^{11}: 9, 24. *Tab. 1–5.* May, 1919.—Experiments conducted for three years with the use of lime-sulphur as summer spray for apple scab in Northern Idaho has shown that three applications —(1) when blossom buds show pink, (2) when petals fall, and (3) three weeks after petals fall, completely controlled scab on most varieties of apples. Grimes being more resistant to scab, one application, at time the buds show pink, was found sufficient to reduce scab to a negligible amount. Experimental data are given.—*A. E. Murneek.*

2783. Waterbury, H. E. [Plant diseases and treatments.] Bienn. Rept. Washington [State] Dept. Agric. (3) 1917–18: 84–87. 1918.

2784. West, Erdman. **An undescribed timber decay of hemlock.** Mycologia **11**: 262–266. 1919.—See Bot. Absts. 4, Entry 1188.

2785. Westerdijk, Johanna. **Neueres über Flachskrankheiten. [Flax diseases.]** Jahresber. Vereinig. Angew. Botanik **16**: 1–8. 1918.—Flax blight, caused by *Fusarium lini*, is very destructive in Holland. White-flowered flax is more resistant than blue-flowered kinds.—Rust (*Melampsora lini*) appears in wet seasons when the plants are nearly mature and only on white-flowered kinds. It develops best on highly fertilized, rank plants.—Anthracnose (*Gloeosporium lini*) occurs on stem, capsule and seed. It is controlled by seed treatment, for 3 hours, with formaldehyde vapor.—*Botrytis cinerea* may appear in damp weather particularly on seedlings.—A dead-stem disease has appeared in North Holland. Plants are brown and dry. A species of *Phoma* occurs on many plants but not on all. [From abstract by O. K[irchner] in Zeitschr. Pflanzenkr. 29: 121. 1919.]—*D. Reddick.*

2786. Winston, J. R., and Fulton, H. R. **The field testing of copper-spray coating on foliage.** Better Fruit 13^{12}: 9, 27–28. June, 1919.—A field test has been devised to indicate the copper-spray coating on foliage. The method is as follows: 200 gm. of fresh leaves are washed for 3 minutes in 1000 cc. of 0.2-per cent solution of chemically pure nitric acid in water. Some of the wash water is treated with a few drops of 2-per cent solution of potassium-ferrocyanide to precipitate copper. A color comparison is then made with a series of standard copper solutions of known strength. The latter are made by proper dilution from a stock solution of 3.928 gm. of copper sulphate in water to make 1000 cc.—About 75 spraying schedules, extending over two seasons, have been tested. Representative results of tests on apples in Virginia and grape fruit and nursery stock in Florida are considered in detail. The authors conclude that the method may be of service (1) "To secure data showing the persistence of copper-containing sprays as it may be influenced by method of preparation, weathering, or other factors; (2) to determine the minimum and maximum limits of working safety-zones, as measured by evenly distributed residues, effective to the practical control of specific diseases; (3) to secure prompt correction of faulty spraying practices, either in the preparation of mixtures or in the times or modes of application; and (4) to serve as a practical guide in timing new applications, especially after rainy periods."—*A. E. Murneek.*

2787. Wormald, H. **The brown rot diseases of fruit trees with special reference to two biologic forms of Monilia cinerea Bon. I.** Ann. Botany **33**: 361–404. *Pl. 25–26.* 1919.—Two distinct species of *Monilia* (*fructigena* and *cinerea*) occur as parasites on fruit trees in England. Each species has two forms, to be distinguished by the effects produced on mature apples inoculated under laboratory conditions.—*M. cinerea* has two biologic forms, *mali* and *pruni*, the former only, being able to produce a blossom wilt and canker disease of apples. Literature is reviewed extensively, methods and experiments are described in detail and a lengthy bibliography is appended.—*D. Reddick.*

2788. Wöber, A. **Ueber die chemische Zusammensetzung der Kupferkalkbrühe. [Chemical composition of Bordeaux mixture.]** Zeitschr. Pflanzenkrankh. **29**: 94–104. 1919.—Discussion of the precise chemical actions taking place in the preparation of Bordeaux mixture. Alkalinity of solution is essential; acidity is easily removed by rain, and this makes solution likely to cause damage by burning.—*H. T. Güssow.*

2789. Wurth, Th. **De schade aangericht door de Kloetuitbarsting op de koffie- en Rubberlanden van den Kloet. [Damage to coffee and rubber by the Kloet eruption.]** Proefsta. Malang [Java] Circ. 7. *3 p.* 1919.—Preliminary survey of the damage to 31 plantations on the slopes of the Kloet volcano is given. Besides the local destruction of trees by mud streams and falling stones, most of the high-lying areas showed severe scorching and death of leaves attributed to heated air currents and also to ash rains, with possibly poisonous gases. Hard-packed layer of sand and ash particles, in consequence of the presence of colloidal silicic acid, caused damage by preventing entrance of air and water to the soil.—*R. D. Rands.*

2790. Zacharewicz, Ed. **Traitements contre le mildiou et l'oidium. [Treatment for the mildews of grapes.]** Jour. Agric. Prat. **31**: 127–128. 1918.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

NEW PLANTS FOR PHARMACEUTICAL USES

2791. Church, T. A. **Sphagnum moss now commercial product.** Pharm. Era **52**: 253–255. *4 fig.* 1919.—The author states that the recent war developed the use of this article as a surgical dressing and that it is now offered on a commercial scale, promising to supplant cotton and other absorbent materials for some uses. He gives a history of the discovery of the uses of Sphagnum, the search for and discovery of the plants in commercial quantities and their descriptions, development, habitat, etc. The most important species are *S. imbricatum*, *S. palustre*, and *S. papillosum*.—*Oliver Atkins Farwell.*

2792. Youngken, Heber W. **Notes on the dasheen and chayote.** Amer. Jour. Pharm. **91**: 498–510. *15 fig.* 1919.—Article embraces descriptions of the macroscopical and microscopical characteristics of the two vegetables, the Trinidad dasheen—*Colocasia esculenta* (L) Schott—and the Chayote—*Chayote edulis* Jacq. Data are given concerning their uses and methods are described for their preparation as foods. [See Bot. Absts. 4, Entry 976.]—*Anton Hogstad, Jr.*

MEDICINAL PLANT CULTURE AND PREPARATION

2793. Anonymous. **Scottish station for reseach in plant breeding.** Pharm. Jour. **103**: 191. 1919.—By public subscription in Scotland, £16,000 has been raised, to be supplemented by a similar amount from the public funds, for the establishment of an Institute of Agricultural Botany. Research in drug plant cultivation and breeding is planned. England already possesses such an institute and Wales, through the munificence of one of her citizens, is soon to make a beginning.—*E. N. Gathercoal.*

2794. Anonymous. **The economic resources of Burma. III. Citronella oil.** Chem. and Druggist **91**: 815. 1919.—The distillation of citronella oil from *Andropogon Nardus*. The plant thrives luxuriantly in the jungle districts of lower Burma. Cultivation was begun in 1912 by U. Shwe Thwin who has fathered the industry and overcome many difficulties during the period of the war. In 1914 Burma citronella oil was recognized in the London market, and graded as equal in quality with Java and Ceylon oil. The industry is now well established. —*E. N. Gathercoal.*

2795. De Graaf, W. C. **De cultuur van geneeskrachtige planten in Nederland. [Cultivation of medicinal plants in Holland.]** Pharm. Weekblad **56**: 1101–1112. 1919.—An account of the results obtained in growing belladonna, henbane, stramonium, digitalis, valerian and peppermint, is given. The quantity and quality were very satisfactory.—*H. Engelhardt.*

2796. Hogstad, Anton, Jr. **The medicinal plant garden and the pharmacist.** Northwestern Druggist **27**: 389–391. 1919.—See Bot. Absts. 3, Entry 1915.

2797. Skvortzow, B. W. **Notes on the agriculture, botany and zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch **50**: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 2462.

2798. Todd, P. H. **The cultivation of aromatic plants in the United States.** Amer. Jour. Pharm. **91**: 437–441. 1919.—See Bot. Absts. 3, Entry 1894.

COMMERCIAL SUPPLIES

2799. French, H. B. **Report of the drug market for 1918.** Jour. Amer. Pharm. Assoc. **8**: 634–638. 1919.—A comparative list of the prices for drugs in 1914 and 1919.—*Anton Hogstad, Jr.*

2800. Rusby, H. H. **To safeguard the distribution of crude drugs.** Druggists Circ. **63:** 311–312. 1919.—The author discusses present conditions of the crude drug trade, showing that the broker who may sell more belladonna in a day than all the retail pharmacists handle in a year is under no legal requirement to demonstrate his ability to distinguish belladonna from burdock or poke, while the other is so required. He suggests a change in the law that would require all brokers in crude drugs to employ trained and licensed pharmacognosists who would be held personally responsible by the State for the results of their determinations. —*Oliver A. Farwell.*

2801. Anonymous. **The tonka beans of commerce.** Sci. Amer. Suppl. **87:** 78. 1919.—The tonka tree (*Dipteris odorata*), one of the well-known forest trees of Colombia, Venezuela, the Guianas and Brazil, is variously known also as sarapia, serrapia, tonca, tonqua and tonquin. The tonka tree finds its best development along the Caura River, a large tributary of the Orinoco in Venezuela. Little is known regarding its occurrence in Colombia and Brazil, and it is only sparingly scattered throughout the forests of Trinidad and the Guianas. The tree is rarely cut for the wood it yields, chiefly because of the logging difficulties involved, but also because the fruit of the tree has a commercial value. The tree reaches a height of 15 feet and upward, and may attain a diameter of 3 feet. The wood is very hard, heavy, strong, tough and durable. It has a fine texture and is cross-grained, can be polished and in this state is very valuable for cabinet work and interior finish. Large pink flowers in showy terminal panicles are produced during June, July and August. The fruit is an elliptical flattened pod about 2 inches long and contains a seed which is known in the trade as the tonka bean. The seeds owe their value to a crystalline substance (cumarin), which has a fragrance resembling that of new mown hay. It is used as a flavoring material in tobacco, snuffs, cigars, cocoa, ice creams, confectionery, toilet soaps, hair dressings, cosmetics, flavoring extracts, etc. The oil expressed from the cotyledons of the seeds has a clear yellow color and is used as a therapeutic in medicine. The pulverized seeds form an ingredient used in the preparation of sachet powders.—*Chas. H. Otis.*

2802. Faull, J. H. **Pineapple fungus or enfant de pin or wabadou.** Mycologia **11:** 267–272. 1919.—The history of *Fomes officinalis* as a medicinal plant is discussed.—*H. R. Rosen.*

2803. Lind, J. **Apoteker C. Heerfordts Herbarier. [The herbarium of the chemist C. Heerfordt.]** Bot. Tidsskr. **36:** 1–19. 1917.—See Bot. Absts. 4, Entry 1742.

ANATOMICAL AND HISTOLOGICAL CHARACTERS

2804. Konda, Mantaro. **Untersuchung über die Dicke der Reiskleieschicht. Investigations on thickness of rice husks** [*Oryza sativa* L.]. Ber. Ohara Inst. Landwirtsch. Forsch. **1:** 219–229. 1917.—The author has examined 56 kinds of rice with microscopic measurements of husk thickness. Thickness is greater in the earlier stages of development than when the grain is mature. The outer layer (embryo and endosperm) is very thick in the earlier stages of growth, especially during the "milk" period, but becomes thinner at maturity; the inner layer (perisperm and aleurone) behaves in the opposite manner. Grains harvested when fully mature have very thin husks and their bran contains more aleurone and fat than when they are harvested too soon. Thickness of husk (outer as well as the inner layer) varies with the kind of grain. It is very thick in rice of poor quality and very thin in that of good quality. Grains of better quality produce less bran, which, however, is rich in aleurone and fat. The husks of rice grown in mountainous regions are not significantly thicker than those from lowland rice. The embryo is especially thin in upland rice. Upland bran contains just as much aleurone and fat as does that of good-grade lowland rice. The husk of mucilaginous rice is, on the whole, much thicker than that of ordinary rice. The seed-coat of red rice consists of a layer of large cells, about 7–9 micra thick and filled with red pigment. The whole husk is much thicker here than in the case of white rice.—*M. H. Chow.*

2805. Kondo, Mantaro. **Über Nachreife und Keimung Verschieden Reifer Reiskörner. Investigation on maturity and germination of rice seeds.** [*Oryza sativa* L.] Ber. Ohara Inst. Landwirtsch. Forsch. 1: 361–387. 1918.—The author found that rice grains in the milk (milchreif) already possess germinating power, even if this is low. Immediately after the harvest they germinate little and remain in the resting condition during a period of 30 days, even when the surroundings are good for germination, but if they are kept for about fifteen days after the harvest (or a month if not so dry) then they germinate well. Grains in the "yellow stage" (gelbreif) also germinate but little when just harvested. After being kept for from one to three months, they germinate just as well as the full grown grains. The latter germinate soon after the harvest, but will do better after being kept and further delayed for a month. Mature (todreif) grains germinate at once after harvest, but do not allow any delay. When these are preserved dry, after-ripening (Nachreifeprozess) begins quickly and soon ends, whereas if they are preserved moist, it proceeds slowly and lasts for a long time. When after-ripening is complete, grains which have been kept moist germinate more abundantly and more quickly than those kept dry. The preservation of the immature grains in the straw is often very detrimental; germination goes very slowly and lasts for a long period. The more nearly mature they are and the farther the after-ripening and drying has gone on, the more quickly and uniformly does germination occur.—*M. H. Chow.*

2806. Konda, Mantaro. **Untersuchung der Samen der in Japan vertretenen Brassica-arten. Ein Beitrag zur genauen Feststellung der Sortenunterschiede. Investigation of the seeds appearing as mustard** [*Sinapis*] **in Japan.** A contribution to the exact differentiation of these forms. Berl. Ohara Inst. Landwirtsch. Forsch. I: 123–150. 1917.—The different kinds of mustard may be distinguished by external characteristics and by the inner structure of the seed-coat and of the cotyledons. While the external appearance of each kind of seed varies greatly, each kind has its peculiar form, color, network, size and weight. He lists three shapes: (1) spheroidal, (2) ovoid, (3) chestnut-shaped. There are also distinguishing colors, such as egg-yolk yellow, chestnut-brown, brown, dark brown, wine-red, dark-purple, black-brown and black. The colors of the different kinds of seed are so peculiar that they can often be differentiated through this character alone. They are all very small and vary widely in size and weight, but size and weight are of some value as specie marks. The surface of the seeds coat shows a network which is large and clear in some kinds, or small and indistinct in other cases. This serves as another distinguishing feature. The epidermis of the seed-coat consists either of this and flattened cells, or of polygonal, isodiametric mucilaginous cells, in different kinds. The form of the cotyledons, that of the first true leaves, and the color of the hypocotyledon are very different and are characteristic. The cotyledons are either circular, ovoid or elliptical, according to the species. The first leaf is either linear, spatulate, elliptical or ovoid; either thickly hairy or only slightly so; its margin is smooth, toothed or broken. The hypocotyledon is variously colored,—white, light green, rose, bluish brown or dark violet. Most of these mustard seeds are odorless and tasteless, even when crushed. Only those of takana and karaschi-na are characterized by a sharp, burning taste.—*M. H. Chow.*

2807. Samann, Karam. **An experimental study of Strophanthus Kombe seeds.** Pharm. Jour. 103: 66–67. 1919.—Part I deals with the determination of (a) the activity of the fatty oil present in the seeds; and (b) the existence or non-existence in the de-fatted seeds of a physiologically active body beside the water-soluble strophanthin. Particular effort was made to completely dehydrate the seeds and to ensure absolute purity and freedom from water of the various solvents used, for the activity of the oil and of the ether extract obtained by some previous investigators was probably due to the seeds and solvents not having been well dried. —The results may be summarized as follows: (1) The oil of *Strophanthus Kombe* seeds isolated by dry petroleum ether is inactive.—(2) The ethereal residue is inactive.—(3) The poisonous property of the seeds is due to a water-soluble glucoside or glucosides.—(4) No active principle other than the water-soluble body was removed by any of the solvents employed.—(5) Water completely removes the active principle from the seeds.—(6) Methyl

alcohol comes next to water in being a good solvent for the active principle.—(7) Neither absolute ethyl alcohol nor amyl alcohol completely removes the active principle from the seeds.—(8) Amyl alcohol completely removes the active principle from the aqueous residue but not from the seeds.—(9) Chloroform is a very poor solvent for the active principle.—(10) The water-soluble glucoside or glucosides slow the heart, prolong the period of systole and are non-cumulative.—Part II deals with the determination of the minimum lethal dose. The following are the conclusions:—(1) For a frog the oral minimum lethal dose is about twenty times more than that given by intralymphatic injection.—(2) The toxicity of Kombe strophanthin is practically identical with that of Strophanthin Merck.—In Part III, the assay methods of Barclay, Fromme (1910) and Lampart and Mueller are stated to have given fairly concordant results, which agreed—within limits—with the physiological standardization and were satisfactory on the whole. However it was not possible to completely remove the bitter principle by the methods of Fromme and Lampart and Mueller, which consists in exhausting the seeds with absolute alcohol.—Experiments for exhausting the de-fatted seeds gave the following conclusions: (1) Absolute alcohol is not a good solvent for the active principle present in the seeds.—(2) The lower the percentage of alcohol, the more rapid is the removal of the active principle.—(3) A lower percentage of alcohol than 65 per cent, though it extracts the bitter principle more rapidly, produces an unsightly tincture which is hard to filter.—(4) Water alone is unsuitable, since the aqueous tincture decomposes very quickly.—(5) The best method to prepare a tincture, on a large scale, is to employ slow extraction with 65 per cent alcohol in a long narrow percolator till the seeds are free from bitterness. The resulting tincture may be diluted with 65 per cent alcohol, if necessary, to bring it to the official standard, as determined by chemical and physiological assays.—*E. N. Gathercoal.*

2808. Steenhauer, A. J. **Bijdrage tot de kennis van het geslacht Polygonum. [Contribution to the knowledge of the genus Polygonum.]** Pharm. Weekblad 56: 1084–1101. *16 fig.* 1919.—A microscopical and phytochemical study of several species of *Polygonum*. The following characteristic formations were found.—*P. aviculare* L.: (1) striate cuticle on upper and lower epidermis; (2) margin of leaf revolute.—*P. bistorta* L.: (1) striate cuticle on borders of cells of upper epidermis; (2) monocellular, furrowed, conical hairs on margin of leaf and on lower epidermis.—*P. convolvulus* L.: at margin of leaf are short monocellular, conical hairs with furrowed cuticle.—*P. dumentorium* L.: leaf with hairy margin.—*P. Hydropiper* L.: schizogenous secretion canals in epidermis.—*P. nodosum* L.: long, cotton-like hairs on upper and lower epidermis.—*P. persicaria* L., *P. amphibium* L. and *P. lapathifolium* L.: multicellular conical hairs on margin of leaf and also scattered on upper and lower epidermis.—*P. mite* Schrk. and *P. minus* Huds.: multicellular conical hairs on margin of leaf.—Some species of polygonum contain oxymethylanthraquinones and a method for estimating these is given. *P. convolvulus* L. contains 0.025 per cent; *P. dumentorum* L. contains 0.02 per cent; *P. sachalinense* Schmidt 0.08 per cent in the leaves and 0.03 per cent in the stems; *P. Seboldii* Hort. 0.02 per cent.—*H. Engelhardt.*

2809. Van Wisselingh, C. **Bijdragen tot de kennis van de zaadhuid. Vierde bijdrage: Over de zaadhuid der Cruciferen. [Contribution to a knowledge of seed-coats. Fourth contribution: On the seed-coats of the Cruciferae.]** Pharm. Weekblad 56: 1246–1271. *2 pl., 13 fig.* 1919.—A report on the microscopical structure of the seed-coats of five species of the Cruciferae: *Matthiola incana* R. Br., *Cheiranthus Cheiri* L. (Arabideae), *Brassica nigra* Koch, *Sinapis alba* L. (Brassiceae) and *Cochlearin officianias* (Alyssineae). It was found that in the seeds the two integuments and the innermost integument and the nucellus are separated in the beginning of the growth by cuticles. The cuticle between the integuments disappears during the development of the seed and in some species this takes place also with the cuticle between the innermost integument and the nucellus. In most cases this cuticle remains and indicates in the ripe seed the boundary between seed coat and endosperm. In the cells which form the innermost cellular layer and the outermost seed coat, always a cork tissue is developed. This also takes place in the cells of the innermost cellular layer of the innermost seed coat and in this case the cuticle between the seed coat and the nucellus disappears. In the

ripe seed a cork tissue is developed in the chalaza layer which joins the cork-cell layer and the inner cuticle or both cork-cell layers in such a way that the endosperm and the embryo are covered by cork tissue or by cork tissue and a cuticle. Therefore, not only the tissue which develops from the integuments of the embryo but also the chalaza cork tissue and the tissue which lays outside of this must be considered as seed-coat. [See Bot. Absts. 3, Entry 2453.] —*H. Engelhardt.*

ADULTERATION

2810. Small, James. **Triticum repens: A commercial rarity.** Pharm. Jour. 103: 73–75. *Figs. 1–4.* 1919.—The rhizome of *Triticum repens* is a commercial rarity and the chief, if not the only, substitute is the rhizome of *Cynodon Dactylon.* The lens view of transverse sections of *Triticum repens, Cynodon dactylon, Holcus mollis* and *Agrostis vulgaris* are figured. The examination of 15 samples resulted as follows: seven recent commercial samples from English wholesale firms were pure *Cynodon Dactylon;* one was 75 per cent *Triticum repens* and 25 per cent *Cynodon Dactylon;* and one was pure *Triticum repens.* Two samples of dog-grass from French firms were *Cynodon Dactylon;* two samples from pharmaceutical museums, one sample from an old stock in a retail store and one collected on a Kentish farm, were pure *Triticum repens.*—*E. N. Gathercoal.*

2811. Clevenger, J. F., and Clare Olin Ewing. **Santolina Chamaecyparissus L., an adulterant of Matricaria Chamomilla.** Jour. Amer. Pharm. Assoc. 8: 536–538. *2 fig.* 1919. —A shipment invoiced as "chamomile flowers" labelled in spanish "La manzanilla aroma" was found to consist entirely of the flower heads of *Santolina chamaecyparissus.* A comparison of the 2 flower heads is included.—*Anton Hogstad, Jr.*

PLANT CHEMISTRY

2812. Anonymous. **Determination of oil in seeds.** Sci. Amer. Suppl. 87: 155. 1919.

2813. Cofman, Victor. **A note on "Japanese chiretta."** Pharm. Jour. 103: 82. 1919.—Japanese chiretta, the dry plant of *Swertia chinensis,* recently introduced to the British market, compares very favorably in therapeutic activity with Indian chiretta (*S. chirata*). Similar tinctures (60 per cent alcohol) yielded total solids as follows: *S. chinensis,* 3.12 per cent; *S. chirata,* 1 per cent. The comparative bitterness of the tinctures may be stated thus: quinine hydrochloride, 1–30000; Japanese chiretta, 1–12000; Indian chiretta, 1–1000. Several solvents used in succession on the same sample, in a Soxhlet extractor, yielded the following amounts of extracted matter, as per cent of the sample:

	S. chinensis	*S. chirata*
Petroleum ether (boiling point, 40–50°C.)	3.22	3.20
Ether	5.16	1.34
Chloroform	2.32	0.96
Alcohol (95 per cent)	23.14	8.98
Total extracted matter	33.84	14.48
Ash (whole plant)	3.20	3.24

Chemical constituents of both Indian and Japanese chiretta should be carefully investigated. —*E. N. Gathercoal.*

2814. Berry, Edgar. **A standardization of digitalis preparations.** Pharm. Jour. 103: 69–71. 1919.—The dried leaves of *Digitalis purpurea* were used in the investigation. From previous investigations based on frog heart perfusions, three conclusions may be drawn, viz.: 1. The water-soluble glucosides of Digitalis apparently have the most desirably tonic and slowing effect on the heart, and are non-cumulative and non-toxic. 2. Digitoxin is cumulative and toxic, appearing to enter into actual combination with the heart muscle. 3. The leaf

saponins have a harmful and toxic effect on the heart.—In view of the fact of the great variation of the constituents of Digitalis caused by climatic and soil conditions, it is essential that means be found for estimating the really valuable constituents. To do this, two colorimetric processes for estimating the relative quantities of the glucosides present have been devised. Colorimetric process "A" estimates the water-soluble glucosides only and is designated the "therapeutic value" of the Digitalis tincture. Colorimetric process "B" estimates the total glucosides, viz.: water-soluble glucosides, saponins and digitoxin. Subtracting "A" from "B" gives the "toxic value" of the tincture. To complete the standardization of the drug the minimum lethal dose should be determined either by the usual injection method or by the perfusion method (which is explained in detail in the paper).—In conclusion the author lays much stress on the necessity for careful cultivation of the best strains of plants and the gathering of the leaves under the most suitable conditions year by year, to obtain as uniform tinctures as possible.—*E. N. Gathercoal.*

2815. Hofman, J. J. **De aetherische olie van Cymbopogon Javanensis. Bijdrage tot de kennis der Indische grasoliën. [The ethereal oil of Cymbopogon Javanensis. Contribution to the knowledge of the oils of Indian grasses.]** Pharm. Weekblad 56: 1279–1289. 1919.—The physical and chemical constants of the oil are given and are compared with those of oils obtained from other species of the Andropogoneae, such as palmarosa oil, citronella oil, lemongrass oil, etc.—*H. Engelhardt.*

2816. Mayer, Joseph L. **Quantitative estimation of menthol in alcoholic solution.** Jour. Amer. Pharm. Assoc. 8: 572. 1919.—For the quantitative determination of menthol in alcoholic solutions the author gives the following method: Into an accurately weighed Petri dish (a large watch glass will serve equally well) accurately measure 5 cc. of the sample, then place in a desiccator over sulphuric acid and allow to remain over one night, after which weigh. The increase in weight is due to menthol, the purity of which can be easily determined by making a melting point determination and other physical and chemical tests which may be needed.—*Anton Hogstad, Jr.*

2817. Power, Frederick B. **The odorous principles of plants.** Chem. and Druggist 91: 971–975, 1003–1008. 1919.—This address on the distribution and characters of some of the odorous principles of plants falls into two main divisions. First, a discussion of the chemical nature of essential oils, their wide distribution in plants, the peculiar fact that oils widely different in their chemical nature may occur in the same plant, and the relation between the odor and the chemical nature of the oil. Second, the oils obtained from the natural groups or families of plants are described and not alone is their chemistry presented, but frequently their economic use and value, their adulteration and their commercial production. Among the families included are the following: Coniferae, Gramineae, Liliaceae, Iridaceae, Orchidaceae, Annonaceae, Lauraceae, Cruciferae, Rosaceae, Myrtaceae, Umbelliferae, Labiatae, Compositae. All of the plants mentioned are identified with their botanic names. In conclusion, the author discusses the world production and trade in volatile oils. The address is a résumé of the most modern thought on this subject.—*E. N. Gathercoal.*

PLANT CHEMISTRY AND PHARMACEUTICAL ASSAYS

2818. Pratt, J. H., and Hyman Morrison. **Activity of American digitalis.** Jour. Amer. Med. Assoc. 73: 1606–1611. 1919.—Before the world war the greater part of the digitalis (*Digitalis purpurea*) used in this country came from Germany and Austria though some was imported from England. As early as 1868 Duffield had made tests of American-grown digitalis which, he claimed, when properly gathered and dried was better than the English drug. But for many years the American leaf was unused. In 1910, Wesselhoeft, and in 1911, Hale published assays showing that the American drug was superior to the English leaves with which it was compared. In 1916, Rowntree and Macht found that digitalis from the drug garden of the University of Wisconsin was more active than the samples of English or of old German leaves with which it was compared. In 1917, Roth concluded that

wild grown digitalis from the northwestern states could be used for making the various preparations of digitalis and a highly active product secured which would compare favorably with the activity of cultivated leaves grown under more favorable conditions. Using the one-hour frog method of the U. S. Pharmacopeia, the authors tested 28 samples of American-grown digitalis; only eight yielded tinctures that met the standards of the U. S. Pharmacopeia. The authors discuss the methods of testing, the difference in strength due to soil and climate and to method of drying, the activity of the water soluble glucosides and the toxicity of various species and varieties of digitalis. They reach the following conclusions:—The best American digitalis, both wild and cultivated, is equal in activity to the best European digitalis. Specimens of high potency have been obtained from Virginia, Nebraska, Wisconsin, Minnesota, Oregon and Washington. The majority of samples of American digitalis examined were of low potency. No less than 17 out of 25 samples of American digitalis were below the standard of strength established by the U. S. Pharmacopeia. The average strength of the American digitalis, however, was greater than that of the imported digitalis examined. —All digitalis should be tested biologically before it is gathered in large quantities for therapeutic use.—*Wm. B. Day.*

2819. Sayre, L. E., and G. N. Watson. **Final report on the alkaloids of Gelsemium.** Druggists Circ. **63**: 423–424. 1919. Also in: Western Druggist **41**: 315–316. 1919.—The authors show that the so-called amorphous alkaloid *gelseminine* is not a single alkaloid but a mixture of several having different properties,—*gelsemidine, gelsemidine hydrochloride* which are crystalline and *gelsemoidine* which is amorphous. Other alkaloids are *sempervirine* and *gelsemine*. Methods of procedure, physical description, color reactions, and physiological actions are given in detail.—*Oliver Atkins Farwell.*

2820. Schmidt, James M., and Frederick W. Heyl. **On the stability of Digitalis leaf extracts.** (First paper.) Amer. Jour. Pharm. **91**: 425–436. 1919.—In a study of Digitalis and its preparations the authors noted that the losses in extracts from young drugs were very irregular and that deterioration in alcoholic preparations was much greater than in the young drug itself. They also noted that the leaf contains a constituent much more stable than a second active but unstable constituent, the stable component representing 40 per cent of young dried leaf. The extracts from which the unstable constituent has been removed naturally come to an equilibrium, the activity being greater owing to the predominance of the more stable constituent. The conclusions reached seem to agree with the hypothesis that Digitoxin is the stable and the so-called Digitalein is the less stable component.—*Anton Hogstad, Jr.*

2821. Van Urk, H. W. **Bijdrage tot de kennis van Peucedanum Sativum. (Pastinaca sativa, L.) [Contribution to the knowledge of Peucedanum sativum.]** Pharm. Weekblad. **56**: 1391–1398. 1919.—The fruit does not contain volatile bases, as claimed by Wittstein. The root is free from those substances which are present in the root of Imperatoria, which is probably related to the fact that Pastinaca is a biennial, while Imperatoria is a perennial. The root contains much fatty material, starch, cane-sugar and other sugars, and small amounts of an alkaloid (which is present in all parts of the plant) and of a crystalline substance that is insoluble in water and benzine, but soluble in ether. Glucosides are absent.—*H. Engelhardt.*

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

2822. Ritzema Bos, J. [Rev. of: Giltay, E.: **"Plantenleven; proeven en beschouwingen over enige der voornaamste levensverschijnselen van de planten," 2e deel: de voortplanting. (Plant life: experiments and observations on some of the most important life phenomena of plants, part 2: reproduction.)** 2 ed. J. B. Wolters: Groningen and The Hague, 1918.] Tijdschr. Plantenz. **25**: 99–100. 1919.—A book dealing with the biology and physiology of plants.—*H. H. Whetzel.*

PROTOPLASM, MOTILITY

2823. Küster. [Rev. of: Die Kultur der Gegenwart, ihre Entwicklung und ihre Ziele. (Present day knowledge, its development and object.) Herausgeg. v. P. Hinneberg. III. Teil (Mathematik, Naturwissenschaften, Medizin.) 4. Abteilung: Organische Naturwissenschaften. Unter Leitung von R. v. Wettstein. III. Band: Physiologie und Ökolgie. I. Botanischer Teil. Unter Redaktion von G. Haberlandt. Bearbeitet von F. Czapek, H. v. Guttenberg, E. Baur. Mit. 119 Abbild. im Text. 338 s. B. G. Teubner: Leipzig and Berlin, 1917.] Zeitschr. Allg. Physiol. Referate 18[1]: 24. 1918.—From the review it appears that after a short introduction to plant physiology by Czapek the physiology and ecology of plants is treated in four chapters, Czapek discussing the nutrition of plants (p. 11–125), v. Guttenberg treating of growth and development (p. 126–152), as well as plant movements (p. 153–280), and E. Baur taking up the physiology of reproduction in the plant kingdom (p. 281–329). All sections are treated as well as the nature of the work allows. However, Czapek's discussion of the nutrition of plants is considered the best, especially the section in which protoplasm, colloids, turgor and osmotic pressure, semipermeability and plasmolysis, ionic and molecular reactions, enzymes and poisons are considered. Many points of the most recent investigations are included in v. Guttenberg's treatment. Baur's discussion of the ecology of reproduction is quite exhaustive.—*William J. Robbins.*

2824. Küster, E. Über Vitalfärbung der Pflanzenzellen. I. [Vital staining of plant cells.] Zeitschr. Wiss. Mikrosk. 35: 95–100. 1919.—Non-transpiring organs or portions of organs of plants of normal turgescence can be stained vitally with acid colors. The transpiration stream serves to bring the stain into the neighborhood but is not regarded as instrumental in facilitating the exit of particles from the vessels into the parenchyma.—*H. G. Barbour.*

DIFFUSION, PERMEABILITY

2825. Hibino, S. [Rev. of: Heusser, K. Neue vergleichende Permeabilitätsmessungen zur Kenntnisse der osmotischen Verhältnisse der Pflanzenzelle in kranken Zustande. (New comparative measurements of permeability to ascertain the osmotic relations of diseased plant cells.) Vierteljahrsschr. Naturforsch. Ges. Zürich 62: 565–589. 1917.] Bot. Mag. Tôkyô 33: 135–138. 1919.

2826. Hibino, S. [Rev. of: Trondle, A. Der Einfluss des Lichtes auf die Permeabilität der Plasmahaut und die Methode der Permeabilitäts-Koeffizienten. (The influence of light on the permeability of the plasma-membrane, etc.) Vierteljahrsschr. Naturforsch. Ges. Zürich 63: 187–213. 1918.] Bot. Mag. Tôkyô 33: 138–140. 1919.

WATER RELATIONS

2827. Bates, C. G. A new evaporimeter for use in forest studies. Monthly Weather Rev. 47: 283–294. *6 fig.* 1919.—See Bot. Absts. 4, Entry 178.

2828. Matsushima, Taneyoshi. Kirieda no kyûsui ni tsuite. Untersuchungen über die Wasseraufname bei abgeschnittenen Zweigen. [Studies on intake of water by cut branches.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tôkyô 33: 65–72. 1919.—The author studied duration of water absorption in cut branches of plants of 60 species common in Japan, selected from 31 families. The cut ends were placed under water while the leaves remained in air. The duration of water intake was greater for plants with thick, evergreen leaves such as *Pinus* and *Fotsia* than for those with thin, broad leaves. Branches cut obliquely absorbed more rapidly than did those cut transversely, this being probably due to the larger surface in contact with the water in the former case. When resin, mucilage, latex or gum was present the leaves withered very quickly, since these substances hinder the entrance of water into the vesssels. In such cases the burning of the cut surface made the leaves remain fresh somewhat longer, because of the carbonization of the resin, etc., and the prevention of the development of microörganisms at the cut surface.—*K. Morita.*

2829. McLean, R. C. **Studies in the ecology of tropical-rain forest; with special reference to the forests of south Brazil. I. Humidity.** Jour. Ecology **7**: 5–54. *1 pl., 21 fig.* 1919.

MINERAL NUTRIENTS

2830. Buckner, G. Davis. **The composition of the ash of crab grass (Digitaria sanguinalis) as affected by the soil in which it is grown.** Jour. Amer. Chem. Soc. **41**: 1384–1385. 1919.—The author, while searching for a green plant which contained a large percentage of ash, noticed that crab grass (*Digitaria sanguinalis*) grew and flourished in the middle of a limestone roadway. Comparative analyses were made of a plant grown under the above conditions and of a sample of the same species grown under normal conditions in garden soil. Due care was taken in selecting and preparing the samples. The analyses showed that the intake of inorganic material was not the same in the two specimens, i.e., the sample grown in a comparatively new limestone roadbed which was from 4–5 inches in thickness contained approximately 16 per cent less ash than did a similar sample grown in garden soil. The K_2O was 18.8 per cent less in the first mentioned sample. The sample grown in the limestone contained 22.7 per cent more P_2O_5, 44.0 per cent more CaO and 27.6 per cent MgO. The amount of silica in the two samples was approximately the same. "The outstanding feature in connection with the growth of these two samples of crab grass is that the absorption and retention of these different amounts of calcium, magnesium, phosphorus and potassium cause no observable difference in their external appearance."—*J. M. Brannon.*

2831. Krishnamurti Row, K. **The effect of salinity on the growth and composition of sugar cane varieties.** Agric. Jour. India **14**: 476–493. *11 pl.* 1919.—See Bot. Absts. 3, Entry 2928.

2832. Volhard, J. [Rev. of: Ehrenberg, Paul, and Otto Nolte. **Der Einfluss von der Pflanze aufgenommener Manganmengen auf ihre Zusammensetzung. (Influence of absorbed manganese on plant composition.)** Landw. Versuchsst. **90**: 139–145. 1917.] Biedermann's Zentralbl. Agrikulturchem. **47**: 334–335. 1918.—The reviewer reports that with the use of manganese the authors obtained oat straw which analyzed 0.03 per cent to 0.10 per cent of manganese. The grain contained 0.0035 to 0.02 per cent of manganese. When the manganese content was 0.0139 per cent the ash was 11.0 per cent while with a content of 0.0939 per cent manganese the ash was 12.2 per cent. It was thus shown that an increase of the manganese content of plants to 0.1 per cent produces no certain appreciable changes in the composition of the incombustible matter of the plants.—*F. M. Schertz.*

PHOTOSYNTHESIS

2833. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. **2**: 277–300. 1919.—The method here tested depends on the determination, by means of Fehling's solution, of the reducing power of an aqueous extract of the tissues to be studied. The preparation of the extract and the technique of the chemical determination are the main considerations. Similar lots of material (as leaves) are gathered at the beginning and end of an experiment-period and the extracts prepared from these are compared with respect to their reducing powers. The difference in reducing power (calculated) as amount of dextrose per unit of material employed) is taken to be a measure of the total net photosynthetic activity of the tissues in question, for the experiment-period.—To prepare the aqueous extract, the (fresh or dried) material is first finely subdivided and boiled in water, to extract water-soluble substances from the insoluble portion and to gelatinize starch. After cooling, the mass is digested with "Taka" diastase. The boiling and digesting process is repeated three times and the material is then boiled a fourth time, after which it is treated with lead acetate and excess of this reagent is precipitated with sodium carbonate. The solid material is then filtered out. The extract thus obtained is next boiled with dilute HCl, and NaOH is finally added to render it only slightly acid. To the resulting extract

Fehling solution is added. The precipitate formed is finally weighed and considered as copper oxide; from the amount of this the reducing power of the extract is calculated as though the latter had been a solution of dextrose. Numerous details of technique are given; each operation is to be performed in a standard manner.—The method was tested in a number of ways. Assuming that photosynthetic activity is proportional to the standardized copper-oxide differences, reckoned as dextrose-equivalents, the following are examples of the results obtained. *Phaseolus* leaves showed successively larger activity values, hour by hour, from 8 a.m. to 1 p.m., after which the values were successively smaller. The net activity of inverted *Helianthus* leaves was higher than that of leaves in the normal position. In the foliar rosette of *Taraxacum* the upper leaves showed values about twice as great as those shown by the lowest leaves. When the light intensity (as measured with photo-sensitive paper) was reduced from 100 to 10 the photosynthetic activity of *Phaseolus* leaves was correspondingly reduced from 100 to 6, while a light intensity reduction from 100 to 0.3 showed a net photosynthesis reduction from 100 to only 2.0. Stamens of *Acer nedundo* showed a net activity of about 8 mgm. of dextrose per gram of dry tissue per day. Comparisons of *Equisetum*, *Helianthus*, and *Phaseolus* showed relative transpiring powers (per areal unit) of 1580, 980, and 650, respectively, for the three plants, while the corresponding photosynthetic values were 1500, 2802, and 4491; photosynthetic power appeared to be roughly inversely proportional to transpiring power. The presence of rusts or mildews decreased the net photosynthetic activity of leaves in the cases tested; erumpent *Puccinia* reduced the activity values for *Avena* leaves from 100 to 48. A similar reduction for *Phaseolus* leaves accompanied serious infection by *Tetranychus* (red spider). [Author's abstract of this paper was preliminarily published as Physiol. Res. Prel. Abst., v. 2, no. 6, May, 1919. Full paper also appeared, reprinted without change, in limited edition, as Ph.D. dissertation from Univ. Minnesota.] [See also Bot. Absts. 3, Entries 1375, 1452, 2685.]—*B. E. Livingston.*

METABOLISM, GENERAL

2834. ANONYMOUS. **The anthocyanin pigments in plants and their chemical, physiological and biological functions. Review of a number of recent papers and books on the anthocyanin pigments of plants.** Sci. Amer. Suppl. **84**: 2–3, 7. 1919.

2835. APPLEMAN, C. O., AND J. M. ARTHUR. **Carbohydrate metabolism in green sweet corn during storage at different temperatures.** Jour. Agric. Res. **17**: 137–152. *2 fig.* 1919.—The character and kinetics of the processes involved in the rapid depletion of sugar in Stowell's evergreen sweet corn when it is picked in the milk (or edible) stage has been studied in connection with the effects of different storage temperatures on these processes. From an initial sugar content of about 4.5 to 7 per cent (3.5 to 5 per cent sucrose and 1 to 3 per cent reducing sugars) the sugar content falls off until, at equilibrium, about 1.5 per cent total sugars remain. At the point of equilibrium about 62 per cent of the total sugar and about 70 per cent of the sucrose has disappeared. At 30°C. about 50 per cent of the total sugar and 60 per cent of the sucrose is lost during the first 24 hours. The losses of total sugar in the same time at 20° and 10° are respectively about 25 per cent and 15 per cent. Until about 50 per cent of the total sugars are lost a temperature coefficient of about 2 was found for temperatures from 0° to 30°C. The loss in sugar is due primarily to a transformation to polysaccharids, chiefly starch, and even at the higher temperature, 30°C., only about 0.1 per cent of the loss was due to respiration.—*Otis F. Curtis.*

2836. ASAI, TOICHI, AND MAKATO NAKAMURO. **Über einen kristallinischen Bestandteil von Gardenia florida L. [A crystalline constituent of Gardenia.]** Bot. Mag. Tôkyô **33**: 70–71. 1919.—The authors describe the isolation of d-mannin from the flowers of leaves of *Gardenia*. They also found a chromogen in various parts of this plant and other Rubiaceae which colors intensely blue-green with mineral acids.—*Leonas L. Burlingame.*

2837. Bengtson, Ida A. **The proteus group of organisms with special reference to agglutination and fermentation reactions and to classification.** Jour. Infect. Diseases 24: 428–481. 1919.—A detailed study of the morphology and physiology of *Proteus vulgaris* and closely allied organisms is given. The group is characterized as follows: Rods, varying from short coccoid forms to filaments, gram negative, without endospores, with flagella, when present, peritrichic, aerobes or facultative anaerobes, liquefying gelatin ,often producing characteristic stellate colonies, utilizing amino-acids and generally carbohydrates, and may be saprophytic or parasitic. *Proteus vulgaris* is probably most frequently associated with decomposing organic matter of animal origin, and the extent of its occurrence in water and soil is related to the amount of such organic matter present. Fermentation and agglutination reactions are reported in detail. An extensive bibliography is appended.—*Selman A. Waksman.*

2838. Bourquelot, Em., and M. Bridel. **Synthèses biochimiques simultanées du gentiobiose et des deux glucosides du glycol par l'émulsine. [Simultaneous biochemical syntheses of gentiobiose and of the two (α and β) glucosides of glycol.]** Jour. Pharm. et Chem. 19: 329–335. 1919.—A continuation of the authors' experiments to synthesize glucosides.—*H. Engelhardt.*

2839. Bourquelot, Em., and M. Bridel. **Application de la méthode biochimique a l'étude de plusieurs espèces d'Orchidées indigènes. Découverte d'un glucoside nouveau, la loroglossine. [Application of the biochemical method to the study of various species of native orchids. Discovery of a new glucoside, "loroglossin."]** Jour. Pharm. et Chim., 20: 81. 1919. —In 1913 the authors examined 18 species of orchids, native in France, belonging to the genera *Aceras, Cephalanthera, Epipactis, Limodorum, Loroglossum, Neottia, Platanthera, Ophrys* and *Orchis.* It was found that all these plants contained in aerial portions one or more glucosides which were hydrolyzable by emulsin. The authors succeeded in isolating from *Loroglossum hircinium,* a new glucoside which crystallizes in the form of long, colorless needles, is odorless, and possesses a very bitter taste. It melts at 137°, is levorotatory and does not reduce Fehling's solution. It is hydrolyzed by heating with dilute sulphuric acid or by emulsin.—*H. Engelhardt.*

2840. Bourquelot, Em., and H. Hérissey. **Application de la méthode biochimique á l'étude des feuilles fraîches d'Hakea laurina. Extraction de québrachite et d'arbutine. [The biochemical method applied to the study of the fresh leaves of Hakea laurina. Extraction of quebrachit and arbutin.]** Jour. Pharm. et Chim. 19: 251–255. 1919.—*Hakea laurina* R. Br., syn. *H. eucalyptoides* Meissn., is a tree belonging to the family Proteaceae. Its home is Australia, but it is cultivated in southern France as an ornamental tree. Its branches are sent to Paris in the winter under the name *Hakea* or red eucalyptus. The authors succeeded in isolating from the leaves two glucosides, quebrachit and arbutin, substances which are also present in the leaves of *Grevillea robusta* Cunn., belonging also to the family Proteaceae.—*H. Engelhardt.*

2841. Bridel, M. Marc. **Application de la méthode biochemique aux rameaux et aux écores de diverses espèces du genre Populus. [Application of the biochemical method to the branches and barks of various species of the genus Populus.]** Jour. Pharm. et Chim. 19: 429–434. *Ibid.* 20: 14–23. 1919.—By applying the biochemical method to the branches and barks of *Populus pyramidalis* Rozier, *P. canadensis* Desf., *P. alba* L., *P. Tremula* L. and *P. nigra* L. the authors found various new sugars, which were hydrolyzable by invertin. These possess both higher and lower reduction indices than saccharose and other sugars of this series, such as, gentianose, raffinose, stachyose, and verbascose. The new sugars also differed in other respects and were present both in the woody part of the trees and in the bark. A glucoside with a reduction index higher than 400 isolated from *P. pyramidalis* exists only in the bark. A glucoside with a low reduction index isolated from *P. nigra* also exists in the bark only. The glucoside in *P. canadensis,* also present in the bark only, is probably salicin, which is likewise present in the bark of *P. alba* and *P. Tremula.* The woody part of these two species contains a glucoside which seems to be identical with that present in the bark of *P. nigra.*—*H. Engelhardt.*

2842. BUSOLT, ERNST. Beiträge zur Kenntnis der Kohlenhydrate der Gemüsearten. [The carbohydrate of vegetables.] Jour. Landw. 64: 357. 1916.]—Mannitol was found in the watery extract of asparagus, green beans, peas, cauliflower, and cabbage. Grape sugar was found in cabbages, carrots, and green peas. Fructose and glucuronic acid were liberated from peas. [Based on Blanck's review in Biedermann's Zentralbl. Agrikulturchem. 47: 287. 1918.]—*F. M. Schertz.*

2843. CORDLEY, A. B. Possible cause of "sour sap" in the Pacific Northwest. Better Fruit 13[11]: 6, 30–32. May, 1919.—See Bot. Absts. 3, Entry 2325.

2844. ESMARCH, F. Zur Kenntniss des Stoffwechsels in blattrollkranken Kartoffeln. [Metabolism in potato leafroll.] Zeitschr. Pflanzenkrankh. 29: 1–20. 1919.—See Bot. Absts. 3, Entry 2630.

2845. FOLIN, O., AND E. C. PECK. A revision of the copper phosphate method for the titration of sugar. Jour. Biol. Chem. 38: 287–291. 1919.

2846. HAAS, A. R. C. Colorimetric determinations of the hydrogen ion concentration in small quantities of solution. Jour. Biol. Chem. 38: 49–58. 1919.—Lacmoid paper was successfully used for approximate determination of P_H values in small quantities of solution. This may be supplemented by use of the spot plate method. The P_H values obtained by these methods differ by 0.4 to 0.2 from those obtained by more exact methods such as the electrometric or the usual Sörensen colorimetric method.—*George B. Rigg.*

2847. HESS, A. F., AND L. J. UNGER. The scurvy of guinea pigs. III. The effect of age, heat and reaction on antiscorbutic foods. Jour. Biol. Chem. 38: 293–303. 1919.—Canned tomatoes are an excellent anti-scorbutic. Boiling decreases, but does not destroy, their efficiency. Under certain conditions orange juice loses its aptiscorbutic property when rendered slightly alkaline. The same rule seems to hold for alkalinization as for heating; i.e., the length of time the antiscorbutic food is subjected to the deleterious influence is fully as important as the intensity of the process.—*George B. Rigg.*

2848. JENNINGS, DAVID S. Effect of certain colloidal substances on the growth of wheat seedlings. Soil Sci. 7: 201–215. 1919.—See Bot. Absts. 3, Entry 2945.

2849. JONES, H. M. A rapid hydrogen electrode method for determination of hydrogen-ion concentration in bacterial cultures or in other turbid or colored solutions. Jour. Infect. Diseases 25: 262–268. 1919.—A new hydrogen electrode vessel is described which is easily constructed, is accurate at least to 0.01 P_H and gives rapid saturation with hydrogen gas. A technic is described combining the indicator and the gas-chain methods, greatly simplifying the procedure, especially where a large number of determinations are to be made.—*Selman A. Waksman.*

2850. KENDALL, E. C. Isolation of the iodine compound which occurs in the thyroid. Jour. Biol. Chem. 39: 125–147. 1919.

2851. KENDALL, A. I., A. A. DAY, A. W. WALKER, AND M. RYAN. The fermentation reactions of certain streptococci. XLII. Studies in bacterial metabolism. Jour. Infect. Diseases 25: 189–206. 1919.—With the isolation of 356 cultures of organisms from cases of pneumococcus pneumonia, from empyemas, blood cultures, and autopsies, and also obtained from several institutions, the various organisms were compared in regard to their ability to ferment certain carbohydrates and their derivatives. A relation exists between the stereoisomerism of members of the various groups of carbohydrates having the same empirical formula, and their utilization by different types of bacteria. The fermentation reactions of the bacteria afford a means of their identification. The bacteria, including the streptococci, can therefore conveniently be classified into groups on the basis of fermentation reactions.

It is suggested that the specificity of the carbohydrate reactions induced by bacteria may be used as delicate tests of important theories relating to carbohydrates, as, for example, the formation of enols and of tautomerism. No relationship seems to exist between cultural grouping based on the fermentation of carbohydrates and pathogenesis.—*Selman A. Waksman.*

2852. Mach, F., and P. Lederle. **Die Verwendung von Titantrichlorid in der analytischen Praxis. [Use of titanium trichloride in analytical practice.]** Landw. Versuchsst. **90**: 191–224. 1917.—The author recommends some changes and simplifications in the Rhead-Moser method of titrating copper. The method is extended to estimate the cuprous oxide set free in sugar determinations, hydrogen peroxide, and the iron in iron sulphate. The necessary solutions and conditions for titration as well as the apparatus required are given in the review mentioned below. [Based on Volhard's review in Biedermann's Zentralbl. Agrikulturchem. **47**: 295–297. 1918.]—*F. M. Schertz.*

2853. McClendon, J. P., and P. F. Sharp. **The hydrogen ion concentration of foods.** Jour. Biol. Chem. **38**: 531–534. 1919.—Vitamines deteriorate more rapidly in alkaline than in acid media. All foods examined, both of plant and animal origin were on the acid side of neutrality.—*George B. Rigg.*

2854. McCollum, E. V., N. Simmons, and H. T. Parsons. **Biological analysis of pellagra-producing diets. VI. Observations on the faults of certain diets comparable to those employed by man in pellagrous districts.** Jour. Biol. Chem. **38**: 113–146. 1919.—The legume seeds, notwithstanding their high protein content, do not appreciably improve diets that predispose to pellagra, because of the poor quality of their protein and their failure to supplement a diet derived from vegetable foods of the storage tissue class in other respects (e.g., fat-soluble A). The prevalence of pellagra in certain parts of the South is in large part corrected with the growing of cash crop (cotton) and purchasing from the retail store foods among which are many made from degerminated and decorticated parts of grains. Food products that can be handled commercially without hazard are not in general satisfactory food stuffs unless properly supplemented with certain others which correct their deficiencies. —*George B. Riggs.*

2855. Okey, Ruth. **Studies on the behavior of inulin in the animal body. Preliminary paper. Application of the Benedict method to the estimation of levulose and inulin.** Jour. Biol. Chem. **38**: 33–42. 1919.—Benedict's modification of the Lewis-Benedict method has been used successfully for the determination of levulose, and of levulose in the presence of inulin.—*George B. Rigg.*

2856. Osborne, T. B., and L. B. Mendel. **Nutritive factors in plant tissues. II. The distribution of water-soluble vitamine.** Jour. Biol. Chem. **39**: 29–34. 1919.—The indispensable food factor known as water-soluble vitamine is widely distributed in naturally occurring food products. Its presence in the seeds of cereals and of a number of legumes is well known. Among products recently shown to contain it are cottonseed, millet seed, flaxseed, kaffir corn, hempseed, cabbage, alfalfa, clover, timothy, and spinach.—*George B. Rigg.*

2857. Thomas, E. E. **Frozen lemons and oranges for by-products.** California Citrograph **4**: 78, 81, 104. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2374.

2858. Tschirch, A. **Die Lokalisation der chemischen Arbeit in der Pflanze. [The localization of chemical work in the plant.]** Mitteil. Naturforsch. Ges. Bern **1917**: 138. 1917.] —Not only the protoplasm but also the cell wall can do chemical work. This is deduced from the fact that some secretions, such as wax and ethereal oils, are not found within the cell. The cell sap also does chemical work, as the layer of protoplasm in the epidermis is so small in amount that only enzyme production can be assigned to it. The alkaloids occur chiefly in the epidermis, the bundle sheath, and the medullary rays. They are lacking, as a

rule, in specific assimilating tissue, such as the palisade tissue, and are not found in the vascular bundles. The decomposition products of the proteins which might prove harmful are removed by being fixed as alkaloids. The basic materials are formed in the assimilating tissue and transported to storage organs and to the places where they are used. The waste material is laid down in the epidermis, in the bundle sheath, and in the "physiologically dead" tissue. [Based on Lipschütz' review, Zeitschr. Allg. Physiol. Referate 18^2: 25–27. 1919. —*William J. Robbins.*

2859. Tuttle, Gwynethe M. **Induced changes in reserve materials in evergreen herbaceous leaves.** Ann. Botany 33: 201–210. *7 fig.* 1919.—The author, after first considering the general features of plants with winter reserves in the form of starch and fat respectively in the cold regions of northwestern Canada, records a series of experiments with *Linnaea borealis* L. var. *americana* (Forbes) Redner, concerned with inducing changes in the reserve material. *Linnaea* passes the winter with oil as the reserve and no starch. Artificial exposure to higher temperature in darkness during January resulted in the disappearance of oil and the re-appearance of starch in two days. The starch disappears when again exposed to moderately low temperature for about 8 days, but the leaves are killed if exposed to extremely low temperature when filled with starch. A decrease in the oil content is evident in leaves which have formed starch by conversion. The presence of lipase was demonstrated in material undergoing conversion. Oxidases are present in the leaf at rather low temperatures.—*F. J. Lewis.*

2860. Waksman, Selman A. **Studies in the metabolism of Actinomycetes. II.** Jour. Bact. 4: 307–330. 1919.—In this paper the author reports the results, as well as the methods employed, of growing several different species of *Actinomyces* upon egg media, gelatin, and media containing different carbohydrates. Organisms which produce proteolytic enzymes when grown in milk or on coagulated blood serum hydrolize the coagulated egg-albumen and also liquefy gelatin rapidly. The liquefication of gelatin is not a specific characteristic of the forms studied since nearly all liquefied this medium more or less. The rapidity of liquefication, however, and the amino nitrogen content of the liquefied gelatin showed differences in the different organisms. Several organisms produced brown to black pigment on the egg medium, probably due to the production of the enzyme tyrosinase acting upon certain egg constituents. In determining the utilization of fourteen different carbon compounds by twenty-seven different organisms it was found that starch is probably the best source of energy for most Actinomycetes next in order follow glucose, lactose, maltose, glycerin, sucrose, cellulose, and organic acids; it is probable that the utilization of the carbohydrate is affected by the source of the nitrogen used in the metabolism. The reaction upon the various carbohydrates was determined by the changes in hydrogen-ion concentration. [See also Bot. Absts. 3, Entry 2883.]—*Chester A. Darling.*

2861. Williams, R. J. **The vitamine requirement of yeast. A simple biological test for vitamine.** Jour. Biol. Chem. 38: 465–486. 1919.—The water-soluble, beri-beri-preventing vitamine, relatively so abundant in yeast, is necessary for the nutrition of yeast cells themselves. The fat-soluble vitamine apparently has no effect on yeast growth. The growth of yeast cells may be used as a simple biological test for vitamine.—*George B. Rigg.*

2862. Willstätter, Richard, Otto Schuppli, and Erwin W. Mayer. **Untersuchungen über Chlorophyll (von Richard Willstätter) XXV; Über Phytol II. [Investigations upon chlorophyll; concerning phytol II.]** Ann. Chem. [Liebig] 418: 121–147. 1919.—Willstätter and his co-workers have previously isolated phytol from chlorophyll and identified it as an unsaturated primary alcohol, corresponding to the formula $C_{20}H_{39}OH$. Failure of the compound, and most of its derivatives, to crystallize has led to the use of its ether-soluble sodium salt, phenyl and α-naphthyl urethane, and the peculiar solubility of the silver salt of its phthalic acid ester, for purposes of identification. The latter, on heating with soda-lime, produces a saturated carboxy acid, "phytan säure." This acid is easily converted into an

isomeric lactone, showing the attachment of alkyl groups to the α and β carbon atoms, with double linkage between these atoms. The double linkage of raw (α) phytol is between the fifth and sixth carbon atoms, while that of distilled (β) phytol (probably a geometrically isomeric form) is between the seventh and eighth carbon atoms. Oxidation of phytol, either by way of the ozonide or by means of chromic acid, gives a series of ketones and acids. The ketone products approximate the formula $C_{16}H_{30}O$, but contain an excess of oxygen. It is probable that oxygen occurs in places other than the double linkage of these compounds. The ketone fraction is best purified by means of the crystalline l-naphthyl-hydrazine-4-sulfonic-acid derivative. Purification of this product by way of the semi-carbazide indicates the formula of the principal ketone to be $C_{17}H_{34}O$, yielding the fatty acid $C_{16}H_{32}O_2$ by oxidation. Procedure involves adding the potassium salt of the hydrazine sulfonic acid to a dilute methyl alcohol solution of the ketone, washing with ether and hydrolyzing with either 17 per cent sulfuric acid or pyroracemic acid. The semi-carbazone eliminates the excess of oxygen resulting from the oxidation of the original phytol. Besides formic acid, the chief acid products range from $C_{16}H_{32}O_2$ to $C_6H_{12}O_2$. Absence of normal chain compounds from the products of oxidation renders the previously proposed simple chain formula of phytol improbable. It is proved that its carbon framework is multibranched.—*W. E. Tottingham.*

2863. Yamaguchi, Y. [Rev. of: H. C. Sampson: **Chemical changes accompanying abscission in Coleus blumei.** Bot. Gaz. 66: 32–53. 1918.] Bot. Mag. Tôkyô **33**: 52–54. 1919.

METABOLISM (NITROGEN RELATIONS)

2864. Benton, A. G. **Studies in the nitrogen metabolism of bacteria.** Jour. Infect, Diseases **25**: 231–247. 1919.—The proteolytic action of four bacteria (*B. proteus*, *B. pyocyaneus* *B. typhosus*, and *Staphylococcus*) was studied; they were all found to be strongly proteolytic, destroying coagulate protein in media containing ascitic fluid. The course of proteolysis was followed by the determination of amino-nitrogen by the method of Van Slyke. The ability of a given cell to assimilate amino-acids does not result directly from the simplicity of structure and solubility of these compounds in water. The nature of the particular protein decomposition products present plays a very important part in metabolism, as the power to assimilate a given amino-acid is not necessarily common to all bacteria—but is due to factors which may be absent in some varieties. The avidity with which an organism attacks a protein would be in direct proportion to the amount and variety of free amino-acids present which are represented in the structure of the protein molecule and which that particular kind of cell can assimilate.—*Selman A. Waksman.*

2865. Birckner, V. **Acidimetric titrations of grain extracts and amino-acids in the presence of alcohol.** Jour. Biol. Chem. **38**: 245–254. 1919.—Amino-acids, which in aqueous solution are nearly neutral to phenolphthalein, react distinctly acid in the presence of alcohol.—*George B. Rigg.*

2866. Dutcher, R. A. **Vitamine studies. IV. Antineurotic properties of certain physiological stimulants.** Jour. Biol. Chem. **39**: 63–68. 1919.—Epichitosamine has been prepared. It seems to be an x-amino sugar. Its epimer, chitosamine, has been prepared from chitosaminic acid by the action of pyridine.—*George B. Rigg.*

2867. Hart, E. B,. and H. Steenbock. **Maintenance and production value of some protein mixtures.** Jour. Biol. Chem. **38**: 267–273. 1919.—It is now well known that the efficiency of a protein mixture in growth production will depend upon the quantitative and qualitative make-up of its amino-acid content. A greater utilization of a poor protein mixture can be accomplished by adding to it some single protein or a mixture of proteins with proper supplementing qualities. The efficiency of cereal grains of low production value may be increased by the addition of flaxseed meal in such proportion that 20 to 25 per cent of the proteins come from the flaxseed meal and 75 to 80 per cent from the cereal.—*George B. Rigg.*

2868. Johns, C. O., and A. J. Finks. **Lysine as a hydrolytic product of hordein.** Jour. Biol. Chem. 38: 63–66. 1919.—The basic amino acids found in hordein, the alcohol-soluble protein of barley (*Hordeum vulgare*) are cystine, arginine, histidine and lysine. Lysine has not before been shown to be present in this protein. The percentages of the different basic amino acids in hordein are almost the same as those found in gliadin, the alcohol-soluble protein of wheat. The free amino nitrogen in hordein was found to be equal to one-half of the lysine nitrogen.—*George B. Rigg.*

2869. Joshi, N. V. **Rate of nitrification of different green manures and parts of green manures and the influence of crop residues on nitrification.** Agric. Jour. India 14: 395–413. 1919.—See Bot. Absts. 3, Entry 2937.

2870. McClendon, J. F., and H. J. Prendergast. **Note on the ultra microscopy of egg albumen.** Jour. Biol. Chem. 38: 549. 1919.—When egg albumen was recrystallized three times and a saturated solution of the crystals was made in distilled water, only a few submicrons were found. They are believed to be due to slow precipitation. The more that is known of the physical chemistry of proteins, the less they appear to resemble the suspension colloids, and it seems unfortunate that clear solution of proteins should be classed with suspensoids under the term "colloids."—*George B. Rigg.*

2871. Osborne, T. B., and L. B. Mendel. **The nutritive value of yeast protein.** Jour. Biol. Chem. 38: 223–227. 1919.—Rats were successfully kept for more than a year, covering the period of growth, upon a diet in which yeast furnished the sole source of nitrogen as well as water-soluble vitamine.—*George B. Rigg.*

2872. Osborne, T. B., A. J. Wakeman, and Edna L. Ferry. **Preparation of protein free from water-soluble vitamine.** Jour. Biol. Chem. 39: 35–46. 1919.—Many proteins, especially casein, can easily be prepared so free from water-soluble vitamines that animals fed on them decline in weight within a few days, unless some other source of this food factor is supplied. Edestin is an example of a plant protein that has been so prepared. The chemical nature of vitamines is wholly unknown.—*George B. Rigg.*

2873. Patten, N. E., and A. J. Johnson. **The effect of hydrogen ion concentration on the liquefaction of gelatin.** Jour. Biol. Chem. 38: 179–190. 1919—The setting of gelatin is influenced by the hydrogen ion concentration of the medium, and unless the gelatin is destroyed this effect is probably reversible. Gelatin in the concentrations used is not without effect upon the buffer solutions, displacing the P_H in such a manner as one would expect from an aggregate of amino-acids acting amphoterically.—*George B. Rigg.*

2874. Schouten-Ilcken, W. S. J., and R. W. Tuinzing. **Die Bestimmung des Ammoniakstickstoffs in Düngstoffen auf iodometrischem Wege. [Estimation of nitrogen as ammonia in fertilizers by the iodometric method.]** Landw. Versuchsst. 89: 233. 1917.—The time-consuming and expensive method of distilling with magnesia was discarded at the experiment station and the authors suggest in place of it the use of iodometric methods. Chemical reactions and method of procedure are given in the abstract. Data submitted indicates the accuracy of the method. [Based on Volhard's review in Biedermann's Zentralbl. Agrikulturchen. 47: 297–299. 1918.]—*F. M. Schertz.*

2875. Sherman, H. C., J. C. Winters, and V. Phillips. **Efficiency of oat protein in adult human nutrition.** Jour. Biol. Chem. 39: 53–62. 1919.—In practical dietetics equal weights of oat and maize proteins may be regarded as essentially equal in value. Small amounts of milk will apparently so supplement these that their efficiency is comparable with that of the average protein of a mixed diet.—*George B. Rigg.*

2876. Volhard, J. [Rev. of: Pfeiffer, Th. and W. Simmermacher. **Über die Wirkung des Dicyandiamids auf das Pflanzenwachstum. (The action of dicyanodiamide on the plant growth.)** Landw. Versuchsst. 90: 415–430. 1917.] Biedermann's Zentralbl. Agrikulturchem. 47: 243–246. 1918.—See Bot. Absts. 3, Entry 1792.

2877. Wunschendorff, H. E. Les matières protéiques de la graine menugrec. [The protein substances in fenugreek (Trigonella) seed.] Jour. Pharm. et Chim. 20: 86–88. 1919. —The seeds contain about 27 per cent of proteins, which consist of 25 per cent of a globulin, 20 per cent of α and β albumin and 55 per cent of a nucleoprotein. The latter is rich in phosphorus (1.58 per cent) and iron (3.39 per cent).—*H. Engelhardt.*

METABOLISM (ENZYMES, FERMENTATION)

2878. Draubert, —. Los vinos atacadas de "casse brune." [Wines attacked by "casse brune."] Informacion Agric. [Madrid] 9: 130–132. 1919.—An account is given of the disease of wine known as *casse brune*, said to be due to oxidation. Fungi are sometimes present. Chemical methods of correcting diseased wines are outlined.—*John A. Stevenson.*

2879. Falk, G. K., Grace McGuire, and Eugenia Blount. Studies in enzyme action. XVII. The oxidase, peroxidase, catalase, and amylase of fresh and dehydrated vegetables. Jour. Biol. Chem. 38: 229–244. 1919.—The activity of oxidase, peroxidase, catalase, and amylase in cabbage, carrots, potatoes, and tomatoes was determined. The vegetables were tested in 3 conditions; fresh, air-dehydrated, and vacuum-dehydrated. In general, the activity of oxidase, peroxidase, and catalase was better in more alkaline solutions. The activity was best between P_H 7 and 10, but there is no well-defined maximum. Activity was inhibited in acid solution, P_H 2 and 3 for oxidase and peroxidase and P_H 4 for catalase, except in the case of tomato. Vacuum-dehydrated cabbage and carrot gave stronger oxidase reactions than did the fresh. In every other case the enzyme action was less in the juice from dehydrated vegetable than in that from the fresh. Enzyme activity was less in air blast material than in vacuum material. Well defined maxima in the amylase actions were observed with cabbage, carrot, and white turnip juices at about P_H 6. With yellow turnip juice the optimum action extended from P_H 4 to 7. The enzymes are inactivated by heating in solution for a short time, while food hormones (vitamines, antiscorbutic property, and growth-producing property) are not. The changes that take place in food hormones on their "inactivation" may be considered chemical in their character.—*George B. Rigg.*

2880. Popp, M. Die Inversion von Saccharose durch Invertase. Eine verbesserte Methode zur Bereitung von starken Invertaselösungen aus Presz-oder Bierhefe. [Rev. of: Hudson, C. S. The inversion of sucrose by invertase. VIII. An improved method for preparing strong invertase solutions from top or bottom yeasts. Jour. Amer. Chem. Soc. 36: 1566–1571. 1914.] Biedermann's Zentralbl. Agrikulturchem. 47: 276–277. 1918.—The reviewer emphasizes the following: A method for preparing a stock solution of invertase is described. Such a solution keeps well (1 month or more), has a definitely known and high inverting power and is quite free from impurities. The method of preparation consists in kneading the yeast with tap water and toluene at room temperature, autolyze for several (4–5) days, purify with lead acetate and hydrogen sulphide and then dialyze. The prepared solution is colorless, odorless and tasteless.—*F. M. Schertz.*

2881. Tokugawa, Yoshichika. Kaki no dasshi ni tsuite. On the deastringency in the fruit of Diospyros Kaki. [Title in Japanese and English, text in Japanese.] Bot. Mag. Tôkyô 33: 41–44. 1919.—Astringency of unripe persimmons is due to the existence of tannin as a jelly-like substance in idioblasts of fruit. When ripening occurs astringency decreases and finally disappears, and the fruit becomes sweet. Loss of astringency is the result of hardening of the jelly-like content of the idioblasts so that the tannin becomes insoluble in saliva; it is not the result of the removal or oxidation of the tannin. The tannin found in persimmons is coagulated into jelly by formalin, hydrochloric acid, or sulphuric acid.—*K. Morita.*

2882. Van Laer, Henri. Actions entre enzymes. [Interactions of enzymes.] Zeitschr. Gärungsphysiol. 6: 169–175. 1918.—Van Laer reports some observations on the nature of zymogens and the findings are claimed to be in confirmation of the results of Ford and

GUTHRIE who had shown that the increase of the amyloclastic activity of papain with barley meal is not manifested when the infusion is kept in direct contact with the proteoclastic ferments. The yeast infusions were obtained from yeast prepared according to the Lebedeff method.—The addition of papain to yeast juice destroyed the catalase and zymase. In the state of zymogens there was shown greater stability and resistance to the factors of inactivation. The hefanol extract of yeast in the presence of antiseptics showed a measurable degree of inverting activity. This inverting agent was amylase.—The diastase and papain had no influence upon the hefanol infusion even after a digestion of 24 hours.—Observation is made upon the intensity of autofermentation. After the latter there remains some amylase which is sensitive to papain. This sensitiveness is expressed by the data showing the decrease of the per cent of sugar inverted from 25.6 to 19 when papain was added.—Certain cellular materials, as soluble or incoagulable protoplasmic products, decreased the activity of sucrase according to the concentration. In the presence of small quantities of these substances the rapidity of hydrolysis of saccharose is hardly modified. Extracts of yeasts, inactivated by acetone, give a notable increase of inverting power when added to a solution of papain or active amylase, the yeast cells in this respect behaving like cellular bodies. The above increase is due on the one hand to the increase of sucrase and on the other to the decrease of cellular substance into the digestion products.—*A. M. Gurjar.*

2883. WAKSMAN, SELMAN A. **Studies in the metabolism of Actinomycetes.** [I.] Jour. Bact. 4: 189–216. 1919.—Forty-two different species of *Actinomyces*, many of which were isolated from the soil, were used in the investigation. These were grown on three different culture media: milk, blood agar, and Leoffler's blood serum. The greatest variation in the characters of the different species occurred in milk, the author being able to divide the species tested into five groups depending upon the coagulation of the casein in milk and the peptonization of the coagulum. Several tests were made and the conclusion reached that two different enzymes were operative in bringing about these reactions,—a rennet-like enzyme and a proteolytic enzyme. When the organism was grown in Czapek's synthetic solution the rennet-like enzyme appeared to be dissolved out into the medium, while the proteolytic enzyme was kept largely within the mycelium of the organism. Hemolysis on the blood agar and liquefication of the coagulated blood serum were brought about by species which produced the proteolytic enzyme. [See also Bot. Absts. 3, Entry 2860.]—*Chester A. Darling.*

METABOLISM (RESPIRATION)

2884. BUTLER, O. **Effect of wounds on loss of weight of potatoes.** Jour. Amer. Soc. Agron. 2: 304–305. 1919.—See Bot. Absts. 3, Entry 1861.

ORGANISM AS A WHOLE

2885. DEY, P. K. **Studies in the physiology of parasitism. V. Infection by Colletotrichum Lindemuthianum.** Ann. Bot. 33: 305–312. *Pl. 12.* 1919.—See Bot. Absts. 3, Entry 2618.

2886. HAAS, A. R. C., AND E. B. FRED. **Effect of soybean germination upon the growth of its nodule-forming bacteria.** Soil Sci. 7: 237–245. *1 pl., 2 fig.* 1919.—See Bot. Absts. 3, Entry 2936.

2887. LOHR, P. J. **Untersuchungen über die Blattanatomie von Alpen-und Ebenenpflanzen. [Investigations on the leaf anatomy of alpine and prairie plants.]** Rec. Trav. Bot. Néerland. 16: 1–62. *Fig. 1a–4b* (*8*), *tab.* 1919.—See Bot. Absts. 4, Entry 240.

2888. McATEE, W. L. **Summary of notes on winter blooming at Washington, D. C.** Proc. Washington [D. C.] Biol. Soc. 32: 129–132. 1919.—See Bot. Absts. 4, Entry 246.

2889. MacDougal, D. T., and H. A. Spoehr. **The origination of xerophytism.** Plant World 21: 245–249. 1918.—The authors discuss the direct effects of aridity on carbohydrate metabolism, and conclude that both succulence and xerophytism are the result of a low water supply in the cells, which induces more rapid transformations of the polysaccharids in one direction or another. If this accelerated transformation is toward the pentosans or mucilages, succulence results. But if conversion is toward the anhydrous substances like cellulose and other wall forming materials, xerophytism results. Changes may occur in both directions in the same plant, as in massive cacti, where the epidermal structures are xerophytic, and the cortical regions succulent.—*Chas. A. Shull.*

2890. Northrop, J. H., L. H. Ashe, and J. K. Senior. **Biochemistry of Bacillus acetoethylicum sp. nov. with reference to the formation of acetone.** Jour. Biol. Chem. 39: 1–21. 1919.—An organism has been isolated and described which produces acetone and ethyl alcohol with smaller amounts of higher alcohols from starch or sugar. Optimum cultural conditions have been determined and a semi-continuous method for carrying on the fermentation has been described. Other workers have described several organisms as producing acetone and at least two such organisms have been used on a commercial scale.—*George B. Rigg.*

2891. Pickering, Spencer. **The action of one crop on another.** Jour. Roy. Hortic. Soc. 43: 372–380. *Fig. 54–59.* 1919.—See Bot. Absts. 3, Entry 1773.

2892. Popp, M. [Rev. of: Wagner R. J. **Wasserstoffionenkonzentration und natürliche Immunität der Pflanzen.** (Hydrogen-ion concentration and natural immunity of plants.) Centralbl. Bakt. II, 33: 708–719. 1916.] Biedermann's Zentralbl. Agrikulturchem. 47: 258–259. 1918.—See Bot. Absts. 3, Entry 1668.

GROWTH, DEVELOPMENT, REPRODUCTION

2893. Blackman, V. H. **The compound interest law and plant growth.** Ann. Botany 33: 353–360. 1919.—The growth of an annual plant, at least in its early stages, is reported as following approximately the "compound interest law"—the weight of the seed, the efficiency in the production of new material, and the period of growth corresponding to initial capital, rate of interest, and period of time, respectively. From this, a simple equation is deduced, capable of expressing the growth of active, annual plants.—*R. W. Webb.*

2894. Mitra, M. **Discussion of winter pruning vs. summer pruning.** Better Fruit 13[1]: 8, 26. May, 1919.—See Bot. Absts. 3, Entry 2350.

2895. Simbo, Ippo. **Hompo-san nisan no chûei: Kwansuru Kenkyû. Beiträge zur Kenntnis einiger einheimischen Pflanzengallen in Japan.** [Studies on some plant-galls in Japan.] [Title in Japanese and German, text in Japanese.] Bot. Mag. Tôkyô 33: 1–12. 1919.—The author describes the galls on *Rhus javanica* caused by insects (*Schlechtendalia* sp. and *Nurudeopsis* sp.). He considers their classification and their morphological and histological characters as well as their development. Starch, sugar, fat, a trace of volatile oil, and considerable quantities of tannin are found in the galls, while albumin and calcium oxalate can be demonstrated only in early stages of their development.—*K. Morita.*

2896. Stark, P. [Rev. of: Vöchting, H. **Die Polarität der Gewächse.** (Polarity of plants.) Tübingen, 1918.] Zeitschr. Allg. Physiol. 18[2]: 29–30. 1919.—The reviewer points out that this work is volume 2 of Vöchting's investigations on the experimental anatomy and pathology of plants and that it is his last work. Special attention is directed to the pathological changes which occur in the anatomy of roots and shoots grown with abnormal orientation. A statistical study of the cell length in various regions of the stem of normal plants showed that the average cell length increased from year to year, at first rapidly, then more slowly. In *Salix fragilis* the increase in the first 11 years was from 34.8 to 70.8 units. In the next 56 years the value increased to 89.1 units. In horizontally placed or inverted twigs the

values decreased. The tumors which occur on inverted plants of *Salix fragilis* at the base of new branches are due to the fact that the root pole of the cells of the new twig is in juxtaposition to the root pole of the cells of the original plant. For normal growth dissimilar poles should meet.—*William J. Robbins.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

2897. Stark, P. [Rev. of: Lundegardt. **Ueber Beziehungen zwischen Reizgrösze und Reaktion bei der geotropischen Bewegung und über den Autotropismus. (On the relation between the intensity of the stimulus and the reaction in geotropic movement, and on autotropism.)** Bot. Notiser **1918**: 65–118. 1918.] Zeitschr. Allg. Physiol. Referate 18²: 27–29. 1919.—The reviewer points out salient features of the paper which may be summarized as follows: (1) Bach and Pekelharing have shown that evident geotropism occurs when the product of the intensity of the stimulus and the time reaches a certain constant value. (2) According to Trondle the intensity (i) of the stimulus and the reaction time (T) can be expressed by a mathematical formula, $i(T-k) = i_1(T_1-k)$. (3) Lundegardt finds that the magnitude of the angle of rotation of a root is proportional to the presentation time and also to the intensity of the stimulus. The proportion does not hold for the longer presentation times nor for the larger values of the intensity of the stimulus. If the amount of stimulus (rm) is considered to be the product of the intensity and the presentation time, then the greater the amount of stimulus the more rapidly (v) the angle of rotation reaches a certain value. This can be expressed $rm/r_1m_1 = v-h/v_1-h$, where h is a constant.—*William J. Robbins.*

GERMINATION, RENEWAL OF ACTIVITY

2898. Charles, Mrs. M. E. S. **Germination of wild cucumber.** Amer. Bot. **25**: 66. 1919.—See Bot. Absts. 3, Entry 2244.

2899. Popp, M. [Rev. of: Urban, J., and E. Vitek. **Untersuchungen über die Keimfähigkeit des Rübensamens. (The germination of beet seed.)** Zeitschr. Zuckerindust. Böhmen **40**: 295–300. 1916.] Biedermann's Zentralbl. Agrikulturchem. **47**: 267–269. 1918.—From the account of the reviewer the chief results are as follows: (1) Influence of low temperature on germination. Dry well-ripened beet seed were placed in liquid air (—180°C.) and left for about one-half hour or until the liquid evaporated. They were then germinated between blotters at a temperature of 20–30°C. The frozen seed were not injured by the low temperature and 95 per cent of them germinated. Experiments were also conducted on moist seed at low temperatures similar to the above and it was found that the seed germinated poorly. If the beet seed at harvest are moist, the power of germination of the seed is conserved by drying artificially. (2) Method of germinating. Germination on filter paper gave far better results (1–13 per cent) than sand beds.—*F. M. Schertz.*

2900. Russell, G. A. **Effect of removing the pulp from camphor seed on germination and the subsequent growth of the seedlings.** Jour. Agric. Res. **17**: 223–238. *Pl. 20–21.* 1919. —The usual method of planting the seed of the camphor tree without removing the pulp has resulted in a very low per cent of germination. Russell has found that the removal of the pulp before planting has resulted in hastening the germination by about two weeks and increasing the germination about 525 per cent. Chiefly because of earlier germination, removal of the pulp from the seed results in an increase in the number of seedlings of transplanting size by about 600 per cent. The resulting seedlings are also larger as shown by measurements of stems, roots, and crowns. Seeds dried at 55°C. failed to germinate, as did also those dried in an attic for several weeks. Seeds soaked in 5 per cent sulfuric acid after removal of the pulp failed to germinate. Seeds fermented in a closed jar for 35 days failed to germinate. Freezing during three successive nights when the temperature fell to 20°F. reduced the germination by about 50 per cent. Soaking seeds in water for ½ hour at 25° and

50° had no effect on germination. Seeds taken from the ground showed less vitality than those picked from the tree, but removal of the pulp increased and hastened germination.—*Otis F. Curtis.*

2901. Stapledon, R. G., and Margaret Adams. **The effect of drying on the germination of cereals.** Jour. Bd. Agric. Great Britain 26: 364–381. 1919.—See Bot. Absts. 3, Entry 1889.

REGENERATION

2902. Nagai, Isaburo. **Induced adventitious growth in the gemmae of Marchantia.** Bot. Mag. Tôkyô 33: 99–109. *5 figs.* 1919.—Gemmae treated with 10 per cent KNO_3 (and similar hypertonic solutions) exhibited many cells plasmolyzed but not killed. When these plasmolyzed gemmae were cultivated in Knop's solution some cells died and the growing points were usually decidedly retarded. When apical growth was strongly inhibited numerous superficial cells became active and produced adventitious growths, varying from filaments to heart-shaped thalli. A decided positive correlation was found to exist between apical retardation and adventitious growth. Starch is formed abundantly in the old cells of the gemmae but not in those arising from the apical meristem subsequent to treatment. Drying and mechanical injury were found not to be effective stimuli in the production of adventitious growth. The author concludes from this that plasmolysis alters the structure of the protoplasm in such a way as to cause a 90° rotation of the axis of growth.—*Leonas L. Burlingame.*

TEMPERATURE RELATIONS

2903. Chandler, W. H. **Winter injury in New York State during 1917–1918.** Proc. Amer. Soc. Hortic. Sci. 15: 18–24 (1918). 1919.—See Bot. Absts. 2, Entry 723.

2904. Fryer, J. R. **Germination of oats exposed to varying degrees of frost at different stages of maturing.** Agric. Gaz. Canada 6: 337–339. 1919.—See Bot. Absts. 3, Entry 1362.

2905. Lauritzen, J. I. **The relation of temperature and humidity to infection by certain fungi.** Phytopath. 9: 7–35. 1919.—See Bot. Absts. 3, Entry 2679.

2906. Malte, M. O. **Sugar content and its relation to winter hardiness.** [Rev. of: Akerman, A., Hj. Johansson, and B. Platon. Jour. Swedish Seed Assoc., 1918.] Agric. Gaz. Canada 6: 329–331. 1919.—See Bot. Absts. 3, Entry 1380.

2907. McBeth, I. G., and J. R. Allison. **Recent investigations in orchard heating.** California Citrograph 4: 51, 65, 67. *5 fig.* 1919.—See Bot. Absts. 3, Entry 2346.

RADIANT ENERGY RELATIONS

2908. Goodspeed, Thomas Harper. **Notes on the germination of tobacco seed, III.** Univ. California Publ. Bot. 5: 451–455. 1919.—The author finds that, contrary to statements often made, the seed of the great majority of species of *Nicotiana* will germinate in darkness as well as in light. He finds that seeds of 5 varieties of *Nicotiana Tabacum*, representing a large proportion of the basic types from which the commercial strains of American tobaccos have been derived, and of 5 varieties of *N. rustica* will germinate readily in darkness. He found that in the majority of cases the number of both old and new seed germinated in darkness was as great as, or more than, that germinated in continuous light. He found also that seed may germinate in darkness slowly and scatteringly. He emphasizes the necessity of properly controlled experiments in connection with such work.—*W. A. Setchell.*

2909. Hurd, Annie May. **Some orienting effects of lights of equal intensities on Fucus spores and rhizoids.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 201–206. 1919.—Unilateral illumination of sufficient intensity orients the first cleavage plane in certain plant spores, the first cross wall being perpendicular to the direction of the light. To secure monochromatic

light seven Wratten filter screens were used; the wave lengths were determined, and a simple method for measuring and equalizing intensities was devised. Fertilized eggs of *Fucus inflatus* were exposed to light of the seven wave lengths produced and also to white light. An electric arc gave light of all wave lengths, but the heating effect quickly killed the spores. Orientation of the first cell plate occurred in all isolated cells with light of short wave lengths produced by a mercury-vapor lamp. Both intensity and wave length seemed to be factors in the negative phototropism of young rhizoids. With spores germinating in close proximity to each other (within about 0.2 to 0.5 mm. or less), a group orientation occurred, the rhizoidal cell always being toward the center of the group. These orienting effects may be explainable by Child's theory of metabolic gradients.—*H. B. Frost.*

2910. Ridgway, Charles S. **A promising chemical photometer for plant physiological research.** Plant World 21: 234–240. 1918.—The author suggests a solution of 1 per cent uranium acetate and 5 per cent oxalic acid mixed in the proportion of 1:4 as a chemical photometer for a study of light effects. Results of the tests were in general agreement with the Callendar pyrheliometer, although the two instruments involve different portions of the spectrum. The chief advantages are inexpensiveness, ease of taking readings, accuracy of determinations, and automatic integration.—*Chas. A. Shull.*

TOXIC AGENTS

2911. Binger, C. A. L. **The selective inhibitory action of methylene blue and certain other common dyes on the growth of meningococci.** Jour. Infect. Diseases 25: 277–283. 1919.—Gentian violet, crystal violet, brilliant green, Bismarck brown, safranin, and methylene blue were found to have an inhibitory action upon the growth of meningococci. Basic fuchsin, vital red, fluorescin, and eosin did not inhibit the growth of these organisms. On comparing the inhibitory action of mercuric chloride, methylene blue, formaldehyde, and phenol, the first was found to exert the most powerful action, phenol the least, the other two compounds being intermediate. The growth of meningococci was inhibited by methylene blue at dilutions which failed to inhibit the growth of the other organisms with the exception of the gonococcus. The dilution at which methylene blue inhibited the growth of different suspensions of meningococci varied with the number of viable organisms present.—*Selman A. Waksman.*

2912. Davis, D. J. **The effect of potassium iodid on experimental sporotrichosis.** Jour. Infect. Diseases 25: 124–131. *2 fig.* 1919.—See Bot. Absts. 3, Entry 1630.

2913. DeOng, E. R. **Effect of excessive sterilization measures on the germination of seeds.** Jour. Econ. Entomol. 12: 343–345. 1919.—This is a report of a study of the effect of temperature and of different amounts of cyanide, and of carbon bisulphide, all applied for various time intervals, upon the germination of seed treated to stamp out insect infestation. The seed used in the tests were as follows: wheat, 5 varieties; corn, 7 varieties; barley, 2 varieties; oats, 1 variety; rye, 1 variety; rice, 2 varieties; peanuts, 1 variety; alfalfa, 1 variety; peas, 2 varieties; beans, different genera and species; almonds, 14 varieties.—The effect of the treatments on the bean group is given in tabular form. Results indicate that beans are not so susceptible as usually supposed, if they are well cured. The common dosage in fumigation and "heat sterilization" are safe practices, both for grains and legumes, with proper precaution as to length of exposure and ventilation afterwards.—*A. B. Massey.*

2914. Green, H. H., and N. H. Kestell. **Behaviour of bacteria towards arsenic.** South African Jour. Sci. 15: 369–374. 1919.—Differences in tolerance of different bacteria for arsenic are very marked. Many which are fairly tolerant of arsenate are relatively sensitive to arsenite. Certain groups are characteristically sensitive, e.g., the *subtilis* group, of which the four leading representatives were tested, and all found intolerant of 0.05 per cent of As_2O_3 as sodium arsenite in broth. The *colon-typhoid* group is sensitive as a family, but has at least

one outstanding exception in *B. arsenreducens*, and other resistant members probably exist. Although over a dozen arsenic resistant species of bacteria were examined, only two showed any chemical activity towards arsenic; the earlier described *B. arsenoxydans*, which oxidizes arsenite to arsenate, and *B. arsenreducens*, which reduces arsenate to arsenite. The others were merely tolerant. In arsenical dipping tanks an automatic enriching of resistant faecal bacteria and suppression of sensitive forms takes place.—*E. M. Doidge.*

ELECTRICITY AND MECHANICAL AGENTS

2915. Lee, S. C. **Electrical treatment of seed.** Agric. Gaz. Canada **6**: 173–175.1919.

MISCELLANEOUS

2916. Haines, F. M. **A new auxanometer.** Ann. Botany **33**: 181–188. 1919.—A fiber attached to the tip of the plant passes over a vertical support to a differential pulley wheel permitting magnification up to 100, and a connected fiber guides a pen carried on a horizontal trolley along a clock-driven drum. Thus far there is no great deviation in principle from some previous instruments, but a distinctive new feature is found in a device for compensating hygroscopic or other changes in length of the fibers used. It depends on the adjustment of three threads over balanced pulley wheels in such manner that the lengthening of any one is balanced by shortening of another, the details, somewhat complicated and involving use of weights, being not explainable without a diagram. The account is preliminary and not accompanied by test records, which will be awaited with interest in view of the many parts, including 8 pulleys and wheels, involved.—*W. F. Ganong.*

2917. Metge, G. [Rev. of: Wagner, P. **Wie wirkt die Saatgutbeschaffenheit auf den Kartoffelertrag unter dem Einfluss verschiedener Pflanzweite, Düngung und Jahreswitterung. (Influence of the seed stock on the yield of potatoes under the influence of different distances of planting, manuring and weather.)** Deutsch. Landw. Presse **45**: 169, 175–176, 183. 1918.] Biedermann's Zentralbl. Agrikulturchem. **47**: 325–333. 1918.—See Bot. Absts. 3, Entry 1386.

2918. Neger, F. W. **Die Blattrollkrankheit der Kartoffel. [The leafroll disease of the potato.]** Zeitschr. Pflanzenkrankh. **29**: 27–48. *7 fig.* 1919.—See Bot. Absts. 3, Entry 2712.]

2919. Schoevers, T. A. C. **Het krullen van tomatenbladeren. [The rolling of tomato leaves.]** Tidschr. Plantenz. **25** (Bijblad): 11–12. 1919.—See Bot. Absts. 3, Entry 1659.

SOIL SCIENCE

J. J. Skinner, *Editor*

ACIDITY AND LIMING

2920. Anonymous. [Rev. of: Hoagland, D. R., and L. T. Sharp. **Relation of carbon dioxide to soil reaction as measured by the hydrogen electrode.** Jour. Agric. Res. **12**: 139–148 1918.] Jour. Ecol. **7**: 95. 1919.

2921. Anonymous. [Rev. of: Hutchinson, R. H. **Soil acidity as influenced by green. manures.** Jour. Agric. Res. **13**: 171–197.] Jour. Ecol. **7**: 93–94. 1919.

2922. Hartwell, Burt L., F. R. Pember, and L. P. Howard. **Lime requirements as determined by the plant and by the chemist.** Soil Sci. **7**: 279–282. 1919.—Determinations of the lime requirement of soil from limed and unlimed ammonium sulfate fertilized plots and limed and unlimed sodium nitrate fertilized plots showed all samples to have a considerable lime requirement. Pot experiments with beets and lettuce in the above soils treated with varying amounts of freshly hydrated calcium oxide showed that the maximum crop was obtained while the soil still showed a lime requirement of 5000 pounds as shown by analysis after crop growth.—*William J. Robbins.*

2923. LIPMAN, J. G. **Adjusting the soil reaction to the crop.** [Editorial–] Soil Sci. 7: 181. 1919.—Sulfur at the rate of 300–1000 pounds per acre is suggested as a means of producing an acid reaction in the soil suitable for growing scab-free potatoes on land which has been limed to allow the successful growing of lime-loving legumes.—*William J. Robbins.*

2924. MOOERS, C. A. **Abnormality of soils in field-placed cylinder experiments.** Soil Sci. 7: 247–251. 1919.—Five different soils placed in cylinders sunk in the ground and exposed otherwise to natural conditions were found to become unproductive to the extent of crop failure in from 3–8 years, except when limed. For none of the soils was the result observed under field conditions. The crop failure is due to acidity induced by excessive leaching The cylinders prevent run-off which results in excessive leaching.—*William J. Robbins.*

2925. SHARP, L. T., AND D. R. HOAGLAND. **Notes on recent work concerning acid soils.** Soil Sci. 7: 197–200. 1919.—Heating acid soils with cane sugar solution produces marked inversion. Slightly acid or alkaline soils cause only slight inversion. The extracts of acid soils also produce marked inversion but less than the soils.—*William J. Robbins.*

2926. STEWART, ROBERT, AND F. A. WYATT. **Comparative value of various forms of limestone.** Soil Sci. 7: 273–278. 1919.—For application to acid land dolomitic limestone is as effective if not more so than the high-calcium limestone. In a 4-year experiment finely ground limestone was not more effective than was the total product from a $\frac{1}{4}$ inch screen. The annual loss of limestone from the surface 20 inches of two fields was 760 and 542 pounds per acre respectively.—*William J. Robbins.*

ALKALI SALTS

2927. GOKHALE, V. G. **A study of the conditions under which water of tidal saline creeks is utilized for crop production in Kankan.** Agric. Jour. India 14: 422–430. 1919.—*Solanum melongena* and *Capsicum frutescens* were found to grow under conditions of alkalinity caused by using saline irrigation water where other crops failed. The creek waters of the Kankan district vary in salt content during the year. Water from the creeks of the Amber River was found to be suitable for irrigation use until December, but after this time the salt content was too high for agricultural purposes.—*J. J. Skinner.*

2928. KRISHNAMURTI ROW, K. **The effect of salinity on the growth and composition of sugar cane varieties.** Agric. Jour. India 14: 476–493. *11 pl., 5 charts.* 1919.—As a result of experiments during 1914–18 it was found that thick juicy varieties do not grow well in alkaline soils. Karum, Chitton, Kaludai, Boothan, Poovan, B. 298, Purple Mauritius, Magh, Bogapura, J. 36, and D. 74, are varieties which failed in an alkaline soil. Cheni, Naanal, Katha, Saretha, Putli Khajee, Hullu Kabbu, M. 1017, Jagannathia, Dhar, M. 1826, M. 19, and M. 2104 succeeded fairly well. The soil in which the cane grew contained 0.17 per cent total soluble salts, 0.061 per cent was sodium chloride. The checking of growth is traced primarily to the sodium chloride. The effect of growing cane under saline conditions is to give an impure juice containing large amounts of chlorine and potash. It was found that the chlorine content of cane sugar depends on the nature of the variety and the condition of soil and water under which it is grown. The effect of large quantities of chlorine in dry juice is to lower the sucrose, purity and glucose content of that juice. The amount and purity of juice produced by different varieties grown on two soils is given.—*J. J. Skinner.*

2929. SWADI, T. S. **A preliminary note on some new factors affecting the hardness of gur or crude sugar.** Agric. Jour. India 14: 431–439. 1919.—Tabular data are given which show the relation between the soil on which sugar cane grew, character of manure used, water used in irrigation, and character of sugar produced. Grey soil and brackish water produce cane yielding a soft and fluid gur. The quality of gur is influenced by character of soil, in which the cane grew.—*J. J. Skinner.*

INFLUENCE OF BIOLOGICAL AGENTS

2930. Ames, J. W., and G. E. Boltz. **Effect of sulfofication and nitrification on potassium and other soil constituents.** Soil Sci. 7: 183–195. 1919.—The nitrification of dried blood and oxidation of sulfur in the soil increased the water soluble potash, calcium, aluminum and manganese. Magnesium was less easily attacked than calcium. Ammonium sulfate had a solvent effect on calcium and potash.—*William J. Robbins.*

2931. Anonymous. [Rev. of: Gainey, P. L. **Effect of paraffin on the accumulation of ammonia and nitrates in the soil.** Jour. Agric. Res. 10: 355–364. 1918.] Jour. Ecol., 7: 97. 1919.

2932. Anonymous. [Rev. of: Hills, T. L. **Influence of nitrates on nitrogen-assimilating bacteria.** Jour. Agric. Res. 12: 183–230. 1918.] Jour. Ecol. 7: 96. 1919.

2933. Anonymous. [Rev. of: Millar, C. E. **Relation between biological activities in the presence of various salts and the concentration of the soil solution in different classes of soil.** Jour. Agric. Res. 13: 213–223. 1918.] Jour. Ecol. 7: 94. 1919.—The author reports the data obtained from experiments conducted to show the effect of various salts upon the bacterial flora of soils. They tend to prove that the effect of the salts was much modified by the nature of the soils to which they were added. It seemed improbable that the osmotic pressure of the soil solution was the governing factor in determining the nature or abundance of the soil flora.—*Geo. D. Fuller.*

2934. Fellers, C. R. **Longevity of B. radicicola on legume seeds.** Soil Sci. 7: 217–232. 1919.—Dry sterile soy bean and alfalfa seeds were inoculated with *B. radicicola* in nodule infusions, in soil or commercial cultures. After varying periods of storage in dry condition the number of *B. radicicola* per seed was determined by plating methods and nodule formation was determined in soil cultures in the green house. Soy bean or alfalfa seed inoculated with a nodule infusion retain viable organisms on the seed coats for 6–9 months. Infected soil or commercial cultures gave as good results as the nodule infusion. Five minutes contact with the inoculant gave as good results as longer periods of contact. It is not recommended that inoculated seeds be stored for long periods before planting but a delay of several days or even a month should do no great harm.—*William J. Robbins.*

2935. Gainey, P. L. **Parallel formation of carbon-dioxide, ammonia and nitrate in soil.** Soil Sci. 7: 293–311. 1919.—The carbon-dioxide, ammonia and nitrates were determined in soils in cylinders through which a current of air was drawn. The carbon-dioxide and ammonia production under conditions favorable for bacterial activity when cottonseed meal was added to the soil reached a maximum in the second 24 hours. In the case of dried blood the maximum is reached between the 6th and 8th days. Insufficient moisture retards both carbon-dioxide and ammonia production, the latter more markedly. Insufficient aeration retards the carbon-dioxide and ammonia production. Accumulation of nitrate was directly proportional to moisture content. Insufficient aeration retarded the initial accumulation of nitrate but after nitrification became active the accumulation was inversely proportional to aeration.—*William J. Robbins.*

2936. Haas, A. R. C., and E. B. Fred. **Effect of soybean germination upon the growth of its nodule-forming bacteria.** Soil Sci. 7: 237–245. *1 pl., 2 fig.* 1919.—When mercuric chloride is used to sterilize soybeans sufficient mercuric chloride is retained by the seed to retard the development of its nodule bacteria in agar plates in the vicinity of the seed. Germination of bacteria-free soybeans secured directly from the pods excrete no substance toxic to the growth of the nodule bacteria but favor this growth. Nineteen varieties of soybeans tested showed no difference in susceptibility to inoculation.—*William J. Robbins.*

2937. Joshi, N. V. **Rate of nitrification of different green manures and parts of green manures and the influence of crop residues on nitrification.** Agric. Jour. India 14: 395–413. 1919.—The paper discusses; what happens to green manure when incorporated in the soil for the coming winter crop, decomposition of different kinds of green manures, decomposition of different parts of green manure—leaves, stems, roots, effect of the undecomposed tissues or crop residues on the process of nitrification. Three woody plants, sann-hemp (*Crotalaria juncea*), dhaincha (*Sesbania aculeata*) and tamarind (*Tamarindus indica*) and three succulent plants, guvar (*Cyamopsis psoralioides*), cow-pea (*Vigna catjang*) and gokarn (*Clitoria ternatea*) were chosen for the purpose of the experiment. Green whole plants of the above were cut up and used in pot cultures to determine the rate of nitrate accumulation in the soil. Tamarind plants gave negative results for nitrification, yet decomposition and ammonification had taken place. Rate of nitrification of the succulent plants was in an inverse ratio to the succulence of the stems the more tender and easily decomposed the tissues, the slower the nitrification. Because of the greater amount of oxidizable carbonaceous material in the succulent tissues, a smaller amount of nitrogenous material is changed into the ammoniacal condition and consequently less nitrification in the succulent plants than in the woody ones in the early stages of decomposition, or putrefactive bacteria attacking the succulent tissues multiply so rapidly that they form bacterio-toxins and other deleterious substances the presence of which may retard the nitrification. Two other alternatives are offered. True denitrification may set in simultaneously with nitrification, due to the great amount of succulent green manures, or further, putrefactive bacteria may assimilate the nitrates formed, for their own growth. In sann-hemp, dhaincha, guvar and cow-peas over 75 per cent of the nitrogen of the plant is contained in the leaves and the stems. During the first two months after burial of the green manures, accumulation of nitrates is due to the leaves of the plants and not to stems or roots. It is highly probable that the stems and roots serve as a source of energy for nitrogen fixing bacteria, as *Azotobacter*, and so ultimately prove an indirect source of nitrogen.—*F. M. Schertz.*

2938. Plymen, F. J., and D. V. Bol. **The biological determination of the relative availability of different nitrogenous organic manures in black cotton soil.** Agric. Jour. India 14: 414–421. 1919.—The relative availability of the common oil cakes used as manures was determined by studying the rate at which the nitrogen they contain undergoes bacterial transformation. In the black cotton soil of Deccan, koranja (*Pongamia glabra*), and cotton cakes are the most quickly available, with castor cake (*Ricinus communis*) a close third. Mahua cake (*Bassia latifolia*) and sorson cake (*Brassica napus*) are the slowest to nitrify.—*J. J. Skinner.*

CROP FERTILIZATION

2939. Prizer, J. A. **Fertilization of citrus groves during period of high priced fertilizers.** California Citrograph 4: 231, 255. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2359.

FERTILIZER RESOURCES

2940. Burd, J. S. **Peat as a manure substitute.** Jour. Amer. Peat Soc. 12: 53–62. 1919.—The plant food constituents of peat do not have the same value as those of high grade fertilizers. Peat is not commercially or agriculturally as valuable as farm yard manure. The inoculation of peat is regarded as a useless procedure.—*George B. Rigg.*

2941. Hoff, J. N. **Peat fertilizer.** Jour. Amer. Peat Soc. 12: 6. 1919.—U. S. Patent 1,261,025, April 2, 1918, covers a method of preparing fertilizer from peat, by treatment with phosphates and subsequent inoculation with bacteria.—*George B. Rigg.*

2942. Smit, B. T. **Bat Guano.** Union South Africa Bull. 15: 1918. The following table shows the percentages of the various constituents in soils, which are compared with two analyses of bat guano.

	Average of 100 typical Transvaal soils	Bat guano 2151	Bat guano 1472
Organic matter	5.84	4.13	72.00
Moisture	2.40	1.51	
Lime	0.24	....	1.38
Potash	0.19	0.03	1.73
Phosphoric acid	0.05	0.02	6.01
Nitrogen..	0.114	0.06	9.63

It is seen that bat guano number 2151 has a composition far below the average composition of the soils in plant food constituents, while No. 1472 is far above that of the average soil. In analyzing the bat guanos the author found the maximum amount of P_2O_5 to be 17.47 per cent, for K_2O 11.45 per cent, for N 9.63 per cent, and a minimum for P_2O_5 of 0.02 per cent, K_2O trace and nitrogen 0.06 per cent. The average composition of fresh bat guano was found to contain P_2O_5 5.67 per cent, K_2O 1.37 per cent, and N 5.65 per cent. Of 103 samples of bat guano the author classed 28 as nitrogenous, 33 as phosphatic, 8 as balanced, and 34 as worthless.—*F. M. Schertz.*

FERTILITY STUDIES

2943. Anonymous. [Rev. of: Hoagland, D. R. **The freezing point method as an index of variations in the soil solution due to season and crop growth.** Jour. Agric. Res. 12: 369–395. 1918.] Jour. Ecol. 7: 95. 1919.

2944. Anonymous. [Rev. of: Howard, A. **Recent investigations on soil aeration, Part I, with special reference to agriculture.** Indian Forester 1918: 187–202. 1918.] Jour. Ecol. 7: 89–91. 1919.—The author presents data upon the decrease of oxygen and the increase of carbon-dioxide in the soil atmosphere after heavy manuring or when there is a surface accumulation of water. In irrigated soils in Northern India the crops often show symptoms of poor soil aeration leading to a decrease in yield.—*Geo. D. Fuller.*

2945. Jennings, David S. **Effect of certain colloidal substances on the growth of wheat seedlings.** Soil Sci. 7: 201–215. 1919.—Agar added to nutrient solutions increases the growth of wheat seedlings in low concentrations but decreases the growth in higher concentrations of nutrient solutions. The introduction of colloidal silicon into nutrient solutions results in increased weight of wheat seedlings due to the direct absorption of the silicon by the plant. The introduction of quartz, ferric hydroxide, and aluminum hydroxide into nutrient solutions results in decreased growth of wheat seedlings due to the fact that their absorptive power reduces the effective concentration of the nutrient solution.—*William J. Robbins.*

2946. Lyon, T. L. **Experiments in fertilizing a crop rotation.** New York Agric. Exp. Sta. [Cornell] Bull. 399: 19–30. Feb., 1919.—In a rotation consisting of 3 years in hay, followed by maize, oats and wheat, more profitable results were obtained when the fertilizer was applied each year to the timothy than when it was applied to the other crops.—*W. O. Gloyer.*

2947. McMiller, Paul R. **Some notes on the cause of the unproductivity of "raw soils" in humid regions.** Soil Sci. 7: 233–236. 1919.—Some Minnesota subsoils are as productive toward alfalfa when inoculated as are the corresponding surface soils, while others are much less productive. The application of soluble potash and phosphoric acid fertilizers renders these subsoils as productive as the corresponding surface soils.—*William J. Robbins.*

2948. Millar, C. E. **Comparative rate of formation of soluble material in cropped and virgin soils as measured by the freezing-point method.** Soil Sci. 7: 253–257. 1919.—Virgin and cropped samples of 6 soils were washed with distilled water until practically all of the soluble material was removed as indicated by the freezing point method. The moist soils were then incubated at 25°C. and the amount of soluble material which formed determined

by the freezing-point method. Where the cropped soils had given evidence of decreased productivity the rate of formation of soluble material was higher in the virgin than in the cropped soil samples.—*William J. Robbins.*

SOIL CLASSIFICATION

2949. PENDLETON, R. L. Are soils mapped under a given type name by the Bureau of Soils method closely similar to one another? Univ. of California Publ. Agric. Sci. 3: 369–498. *Pl. 43–74. 33 text fig.* 1919.—An inquiry into the physical, chemical, and biological characters of samples of certain soils supposed to belong to the same types. The principal studies were made upon Hanford fine sandy loam and San Joaquin sandy loam. Random samples were not procured, instead, bulk samples were taken from one locality in each area.—The mechanical analyses and moisture equivalent values for the several types showed differences of sufficient magnitude to justify the field separation, but the hygroscopic coefficients were not so distinctly correlated with soil types.—The nitrogen, phosphorus, and calcium content of the types was quite distinct; while the magnesium and potassium content was not well marked.—The ammonifying power of the samples was more closely correlated with type than the nitrogen fixing or nitrifying powers.—Samples of soil used for cultures under glass gave varying results. While different representatives of a given type did not give similar yields of plants, yet "the types are distinct with respect to their fertility, considering their average production."—"It is pointed out that despite its defects, the work of the Bureau of Soils is of value, and is practically the only type of soil classification and mapping possible under the conditions imposed."—A prefatory note by C. B. LIPMAN gives certain criticisms on the methods and validity of soil classification.—*H. S. Reed.*

MOISTURE RELATIONS

2950. ANONYMOUS. [Rev. of: ALWAY, F. A., AND G. R. MCDOLE. Relation of movement of water in a soil to its hygroscopicity and initial moistness. Jour. Agric. Res. 10: 391–428. 1917.] Jour. Ecol. 7: 98. 1919.—The authors conducted experiments on the capillary rise of water and the downward penetration of various amounts of water having their initial moisture always above the hygroscopic coefficient. The relative rates and heights of rise in different soils are not similar to the relative rates and distances of penetration, nor was there a definite dependence of the rise upon hygroscopicity. An abundance of data upon these and similar phenomena of water movement are presented.—*Geo. D. Fuller.*

2951. ANONYMOUS. [Rev. of: STEWART, GUY R. Effect of season and crop growth in modifying the soil extract. Jour. Agric. Res. 12: 311–368. 1918.] Jour. Ecol. 7: 93. 1919.—The author, in presenting a historical review of the subject, draws attention to the contradictory nature of many of the results. Experimental data extending over 2 years with 13 soils, cropped and uncropped, showed not only striking differences between the soluble nutrients of the different soils but also notable differences between the nitrates, calcium, potassium and magnesium in the cropped and uncropped soils of the same sort. Phosphates did not exhibit corresponding differences. In general the investigations show that large amounts of water-soluble nutrients are developed by cultivation, fallowing and biennial cropping.—*Geo. D. Fuller.*

2952. HOWARD, ALBERT, AND G. C. HOWARD. Drainage and crop production in India. Agric. Jour. India 14: 377–387. *2 pl., 2 fig.* 1919.—A general discussion of drainage and effect on soil fertility in India. Illustrations show the effect of soil aeration on root development.—*J. J. Skinner.*

2953. HIBBARD, P. L. Changes in composition of the soil and of the water extract of the soil, following addition of manure. Soil Sci. 7: 259–272. 1919.—Fresh manure when mixed with soil increases the carbon dioxide in the soil, decreases the total carbon, does not affect the total nitrogen, first decreases and then increases the total water-soluble material.—*William J. Robbins.*

MISCELLANEOUS

2954. Cook, O. F. **Experiments in spacing cotton.** Jour. Amer. Soc. Agron. **2:** 299–303. 1919.—See Bot. Absts. 3, Entry 1862.

2955. Kiesselbach, T. A. **Plat competition as a source of error in crop tests.** Jour. Amer. Soc. Agron. **2:** 242–247. 1919.—The investigations were conducted for the purpose of determining the extent to which plat competition is a factor in crop yield tests.—*F. M. Schertz.*

2956. Moreno, Eduardo. **La combustibilidad del tabaco. Contribucion al estudio agro-quemico de la hoja. [Combustibility of tobacco.]** Revist. Agric. Com. y Trab. **2:** 377–379. 1919.—See Bot. Absts. 3, Entry 1879.

2957. Sewell, M. C. **Tillage: a review of the literature.** Jour. Amer. Soc. Agron. **2:** 269–290. 1919.—See Bot. Absts. 3, Entry 1883.

2958. Severance, George. **Twenty-eighth annual report for the year ending June 30, 1918.** Washington [State] Agric. Exp. Sta. Bull. 153. *45 p., 8 fig.* 1919.—See Bot. Absts. 3, Entry 1882.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

2959. Anonymous. [Rev. of: Britton, Nathaniel Lord. **Flora of Bermuda (Illustrated).** *xi+585 p.* Charles Scribners Sons: New York, 1918.] Jour. Botany **57:** 44–46. 1919.

2960. Anonymous. [Rev. of: Ewart, Alfred J., and Olive B. Davies, with appendices by J. H. Maiden, and by A. A. Hamilton, and Edwin Cheel. **The flora of the Northern Territory.** *viii+287 p., 24 pl.* McCarron, Bird and Co.: Melbourne, 1917.] Jour. Botany **57:** 69–71. 1919.—The title is said to be in some respects a misnomer because of the range included. Access to types would have avoided many mistakes into which the authors have fallen. New species and genera are included; some names in opposition to the Vienna Laws. In its general get-up the book is very unsatisfactory. Poor arrangement and typography are criticised. "There is no need to pursue a criticism which might be indefinitely extended, and which is undertaken in the hope that it may influence future publications from the same source."—*K. M. Wiegand.*

2961. Anonymous. [Rev. of: Frederick Lewis' paper before the Linnaean Society on "Notes on a visit to Kunadiyaparawitta Mountain."] Jour. Botany **57:** 134–135. 1919.—*K. M. Wiegand.*

2962. Anonymous. [Brief rev. of: **Flora of tropical Africa, Vol. IX, part 2,** "1918," continuing Dr. Stapf's monograph of the Andropogoneae.] Jour. Botany **57:** 72. 1919.

2963. Ashe, W. W. **Notes on trees and shrubs in the vicinity of Washington.** Bull. Torrey Bot. Club **46:** 221–226. 1919.—Some trees and shrubs are reported which have not previously been recorded from the vicinity of Washington, D. C. The following are described: *Amelanchier canadensis intermedia* (Spach) comb. nov., *Amelanchier sera* sp. nov., *Amelanchier micropetala* (Robinson) sp, nov. *Amelanchier micropetala potomacensis* var. nov., *Carya glabra hirsuta* (Ashe) comb. nov.—*P. A. Munz.*

2964. Baker, Edmund G. **The African species of Allophylus.** Jour. Botany **57:** 181–190. 1919 (concluded from *Ibid.* 57: 160).—Notes are given on forty-five species. In addition the following species are described as new: *A. toroensis*, Uganda; *A. gazensis*, Gaza-land; *A. cuneatus*, Limoru; *A. cazengoensis*, Cazengo; *A. andongensis*, Angola; *A. Talbottii*, Nigeria;

A. Gossweileri, Angola; *A. Ussheri*, Uganda; *A. Dummeri*, Uganda; *A. crebriflorus*, Uganda; *A. Kassneri*, Congo; *A. brachycalyx*, Uganda; *A. Holubii*, Zambesi; and *A. cataractarum*, Rhodesia. The following varieties are described as new: *A. Buchanani* Gilg var. *ugandensis*, and *A. congolanus* Gilg. var. *monophyllus*. *Schmidelia thyrsoides* Baker = *Aphania senegalensis* Radlk.—*K. M. Wiegand.*

2965. Baldacci, A., and A. Béguinot. **Contributo alla flora autumnale ed invernale dei dintorni di Vallona. [Autumn and winter flora of Vallona.]** Nuovo Giorn. Bot. Ital. 25: 70–86. 1918.

2966. Bennett, Arthur. **Cheshire Plants.** Jour. Botany 57: 129–130. 1919.—Notes on R. S. Adamson's paper on the Flora of Northern Cheshire (Jour. Botany 57: 91).—*Ceterach officinarum* and *Potamogeton praelongus* are cited as the only new records for the county. Additional stations are noted for other species in Adamson's list. A few other records are added in the genera, *Elatine, Callitriche, Saxifraga, Arctostaphylos, Euphorbia, Carex* and *Lycopodium.* The Naturalist for 1899, p. 353; for 1904, p. 23; and Spencer Moore's notes in Jour. Botany for 1900, p. 74, are referred to for additional records.—*K. M. Wiegand.*

2967. Bolzon, P. **Aggiunte alla flora dell 'Appennino Ligure-Emiliano. [Appendix to flora of Appenine Ligure-Emiliani.]** Bull. Soc. Bot. Ital. 1918: 55–61. 1918.

2968. Bowles, Chas. W. **Systematic botany.** Amer. Bot. 25: 57–63. *1 pl.* 1919.—An outline of the vegetable kingdom is given, with directions for distinguishing the major groups of plants. The illustrated Key makes these groups more easily comprehended.—*W. N. Clute.*

2969. Britten, James. **Bibliographical Notes, LXXV. Madeira flowers.** Jour. Botany 57: 97–99. 1919.—A review of: (1) Mrs. Penfold's "Madeira flowers, fruits and ferns." Reeve Bros., 1845. (2) Mrs. Augusta J. Robley's "Selection of Madeira Flowers." Reeve Bros., 1845.—*K. M. Wiegand.*

2970. Burnham, Stewart H. **The sedges of the Lake George flora.** Torreya 19: 125–136. 1919.—The region covered includes the New York counties of Washington, Warren and Saratoga, with a few additional records from Essex County. Brief notes on habitat, station and frequency of each species are appended. The total of forms enumerated is as follows: *Cyperus*, 8 species; *Eleocharis*, 8 sp., 2 varieties; *Stenophyllus*, 1 sp.; *Fimbristylis*, 1 sp.; *Eriophorum*, 5 sp., 1 var.; *Scirpus*, 17 sp., 1 var., 1 forma; *Dulichium*, 1 sp.; *Rynchospora*, 4 sp.; *Mariscus*, 1 sp.; *Carex*, 94 sp., 25 var., 1 forma, 2 hybrids.—One new variety is published, *Carex complanata* Torr. var. *robusta*, discovered June 18, 1892, 1 mile north of Kingsbury Street. Four new combinations are made: *Carex Leersii* Willd. var. *angustata* (Carey); *C. Leersii* var. *cephalantha* (Bailey); *C. normalis* Mackenzie var. *perlonga* (Fernald); *C. blanda* Dewey var. *varians* (Bailey).—*J. C. Nelson.*

2971. Chiovenda, E. **Intorno alla priorità dei nomi generici Polystichum e Aspidium. [On the priority of the generic names Polystichum and Aspidium.]** Bull. Soc. Bot. Ital. **1918**: 28–32. 1918.

2972. Correvon, H. **Icones florae alpinae plantarum. [Illustrations of plants of the alpine flora.]** II^9. *29 p., 17 pl., 25 fig., 14 distribution maps.* [No date; copy received June 2, 1919.]—This fascicle describes briefly, gives rather detailed distribution, and illustrates by numerous figures and heliotype plates *Cerastium latifolium* L., *C. pedunculatum* Gaud., *C. uniflorum* Murith, *Saxifraga biflora* All., *S. macropetala* Kerner, *S. oppositifolia* L., *S. geranioides* L., *Senecio Carniolicus* W., *Achillea Barrelieri* Sz., *A. tenuifolia* Schur., and *Artemisia Mutillina* Vill. [In French.] Notes on culture are given, to which R. Farrer has also contributed in English. [See also next following Entry, 2973.]—*O. E. Jennings.*

2973. Correvon, H. **Icones florae alpinae plantarum.** [Illustrations of plants of the alpine flora.] II[10]. *36 p., 16 pl., 25 fig., 16 distribution maps.* [No date; copy received June 2, 1919.]—Brief description, notes on culture, detailed notes on distribution with numerous drawings and plates of the following: alpine plants: *Saxifraga Aizoon* Jacq., *S. firmata* Luizet, *S. pubescens* Pourret, *S. cernua* L., *S. rivularis* L., *Valeriana globularifolia* Ram., *V. supina* L., *Achillea atrata* L., *A. Herbarota* All., *A. moschata* Jacq., and *A. nana* O. Under *Achillea atrata* L., are published, evidently as new, races *genuina*, *Clusiana*, and *multifida*. —*O. E. Jennings.*

2974. Cremata, Merlino. **Una planta rara en la finca "el Chico."** [A rare plant on the "El Chico" estate.] Revist. Agric. Com. y Trab. [Habana] 2: 155–156. 1919.—The name of a plant as determined by various persons is given as *Coccoloba grandifolia* Jacq., in reply to a request in a previous number of this Revista (1: 630).—*F. M. Blodgett.*

2975. DeCandolle, Cas. **Beiträge zur Kenntnis der Piperaceen von Papuasien.** [Contribution to the knowledge of the Piperaceae of Papuasia.] Bot. Jahrb. 55: 204—220. 1918.—I. *Piperaceae Schlechterianae.* Thirteen species of *Piper*, collected by Schlechter in New Guinea, are listed, of which five are described as new, as follows: *P. Schlechteri*, *P. nudipedunculum*, *P. subnudilimbum*, *P. pseudamboinense*, and *P. hirtovarium.* In *Peperomia* five species are listed, of which *P. bismarckiana*, *P. microstachya*, and *P. lasiorhachis* are described as new.—II. *Piperaceae novae imprimis Ledermannianae.* A study based on plants collected by Ledermann in New Guinea. Nineteen species and one variety of *Piper* are listed, of which the following seventeen are described as new: *P. breviantherum*, *P. internovarium*, *P. albopunctatum*, *P. rupicola*, *P. macrostylum*, *P. gibbilimbum*, *P. noveninervium*, *P. nigrovirens*, *P. dumiformans*, *P. brevipes*, *P. albamentum*, *P. chlorostachyum*, *P. cinereocaule*, *P. subvirosum*, *P. longifilamentum*, *P. longipilum*, *P. fuscescentispicum*, and *P. Ledermannii.* In *Peperomia* eight species are listed all of which are described as new, as follows: *P. angustilimba*, *P. pubilimba*, *P. linearifolia*, *P. bryophila*, *P. Bamleri*, *P. Ledermannii*, *P. rubrimaculata*, and *P. udisilvestris.*—*K. M. Wiegand.*

2976. Dunbar, John. **Forty-two distinct forms of hickories.** [Rev. of: Sargent, C. S. **Notes on North American trees—II. Carya.** Bot. Gaz. 66: 229–258. 1918.] Amer. Nut Jour. 10: 20–21. *1 fig.* 1919.

2977. Fiori, Adr. **Piante da aggiungersi alla flora del Bosco Cansiglio e del m. Cavallo nel Trevigiano.** [Additions to flora of Bosco Cansiglio, etc.] Bull. Soc. Bot. Ital. 1918: 35–41. 1918.

2978. Gilg, Ernst. **Die bis jetzt aus Neu-Guinea bekannt gewordenen Flacourtiaceen.** [The known Flacourtiaceae of New Guinea.] Bot. Jahrb. 55: 273–294. *9 fig.* 1918.—Few species of the Flacourtiaceae have been previously known from New Guinea, and these were mostly described in recent years. The family plays an insignificant rôle in the vegetation formations. It is of interest that with the exception of *Casearia* none of the larger genera of this family are represented here by many species. All the genera belong to the indo-malaysian floral region. No keys are given. Critical notes on structure distribution and synonomy are presented. The following genera are treated, with the appended number of species in each: *Erythrospermum*, 1sp., *Hydnocarpus*, 1sp., *Scolopia*, 1sp., *Homalium*, 3sp., *Xylosma*, 1sp., *Flacourtia*, 3sp., *Doryalis*, 1sp., *Bennettia*, 1sp., *Osmelia*, 1sp., *Casearia*, 9 sp. The following species are described as new: *Homalium amplifolium*, *H. pachyphyllum*, *H. acutissimum*, *Xylosma papuanum*, *Doryalis macrodendron*, *Bennettia papuana*, *Casearia Ledermannii*, *C. urophylla*, *C. pachyphylla*, *C. anisophylla*, *C. globifera*, *C. macrantha*, and *C. brunneo-striata*. *Homalium Gilgianum* Laut. is shown to be in reality *Lophopyxis pentaptera* (K. Sch.) Engl. It belongs neither to the genus *Homalium* of the Flacourtiaceae nor to the Rham*naceae* which it very much resembles, but to the Icacinaceae. The position of the genus *Gertrudia* K. Schum. is discussed, and it is shown not to belong to the Flacourtiaceae.

Neither does it belong to the Euphorbiaceae with which it has much in common. Until more and better material is forthcoming, it must remain unassigned to any family.—*K. M. Wiegand.*

2979. Gilg, Ernst, and Rudolf Schlechter. **Ueber zwei pflanzengeographisch interessante Monimiaceen aus Deutsch-Neu-Guinea. [On two geographically interesting Monimiaceae from German New Guinea.]** Bot. Jahrb. **55:** 195–201. *2 fig.* 1918.—Through the rich Ledermann material, it has been possible to show that the genera *Trimenia*, *Piptocalyx*, and *Xymalos* are true Monimiaceae, a fact about which Bentham and Hooker and also Perkins and Gilg were in doubt. It is shown, through statistics from the various genera of the Monimiaceae, that there is here good evidence in support of the contention that the flora of the Polynesian Islands, with the exception of Hawaii, and that of northern Australia are extensions of the very characteristic Papuan flora. They are in fact a relic of that flora. *Trimenia* and *Piptocalyx* are especially discussed. *T. papuana* Ridl. is redescribed, and *P. macrurus* is described as new. Previously there was but one species known in each genus.—*K. M. Wiegand.*

2980. Godfery, M. J. **"Epipactis media (Fries!)"** Bab. Jour. Botany **57:** 80–83. 1919. —A discussion of the *E, media* of Babington, and the subsequent incorrect application of this name in English botany. The confusion of *E. viridiflora*, *atrorubens* and *latifolia* is discussed. Material from the original locality of *E. media* was studied, and the conclusion reached that it was *E. viridiflora* Reich. Its first record as a British plant was by Leighton in 1835. "The subsequent application of the name *E. media* to specimens of *E. latifolia* with rugose bosses appears to have been founded on a misapprehension, and the term *E. media* should now disappear from British botany, except as a synonym of *E. atrorubens*" with which it was confused.—*K. M. Wiegand.*

2981. Henrard, J. Th. **Galeopsis, een sytematisch-floristische studie. [Galeopsis, a systematic and floristic study.]** Nederland, Kruidkundig Arch. **1918:** 158–188. May, 1919.— To be continued.—Monograph of the species and the varieties of the genus with keys, descriptions, and critical notes. Nine new varietal names and new subspecies and subvarieties are referred to.—*J. A. Nieuwland.*

2982. Henriksson, J. **Om Corylus Avellana. Supplementum I.** (Swedish, with Latin diagnosis.) Bot. Notiser **1918:** 297–299. *3 fig.* 1918.—Six new varieties are described.— *P. A. Rydberg.*

2983. Hole, R. S. **A new species of Ixora.** Indian Forester **45:** 15–16. 1919.—*Ixora Butterwickii*, allied to *I. spectabilis* Wall. and *I. pendula* Jack, is described from the Palwe Reserve in the Yamethin district of Burma. A fuller description with illustrations is shortly to be published in the Indian Forest Records.—*J. R. Schramm.*

2984. Hole, R. S. **Interpretation of botanical terms.** Indian Forester **45:** 27–28. 1919.

2985. Holmberg, Otto R. **Carex diandra × paniculata, en for Scandinavien ny hybrid. [Carex diandra × paniculata, a new hybrid for Scandinavia.]** [Swedish.] Bot. Notiser **1918:** 249–252. *1 fig.* 1918.—The specimens were found at Lomma, province of Skåne, Sweden. As these specimens differed somewhat from the original ones from Germany, the author compares them with the parents, which were not typical forms of said species, but f. *tenella* of the former and f. *simplex* of the latter.—*P. A. Rydberg.*

2986. House, Homer D. **A small collection of plants from central New York, collected by Dr. Asa Gray, 1832.** (Rept. of the State Botanist, 1917.) New York State Mus. Bull. **205–206:** 10–13. 1918.—A list of 127 species collected in May, 1832, at Utica, Little Falls, and Paris, New York, together with a letter giving historical data.—*Alfred H. W. Povah.*

2987. House, Homer D. Notes on local floras, V. (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 14–31. *2 fig.* 1918.—Notes on range of 50 species in New York State are given with an outline map of the state showing the distribution of three species of *Ophrys.—Alfred H. W. Povah.*

2988. House, Homer D. Two plants new to the flora of the United States. (Rept. of the State Botanist, 1917.) New York State Mus. Bull. 205–206: 31. 1918.—*Geryonia ciliata* (Haw) House comb. nov., a native of India, was found on dredgings at Ferndale, Oregon, and *Geranium pyrenaicum* Burm. f., a native of Europe, was found on a mussel reef at Cape Arago, Oregon, by Dr. W. Haydon. Specimens of the former have been deposited in the Gray Herbarium.—*Alfred H. W. Povah.*

2989. Jansen, P., and W. H. Wachter. Floristische aanteekeningen. XV. [Floristic Notes.] Nederland. Kruidkundig Arch. 1918: 90–110. May, 1919.—Keys and descriptions of adventive plants to Holland, also varieties and hybrids. These are described strikingly in balanced columns thus aptly emphasizing distinctive characters.—*J. A. Nieuwland.*

2990. Kloos, Jr., A. W. Verslag van de Pinkster excursie in the omgeving van Weert. [Report of the Pentecost excursion in the neighborhood of Weert, Holland.] Nederland. Kruidkundig Arch. 1918: 73–89. May, 1919.—The plants that were found on the expedition, many adventive and new to the locality, are reported with remarks as to origin, character, and abundance.—*J. A. Nieuwland.*

2991. Lacaita, C. Piante Italiane critiche o rare. [Critical or rare plants of Italy.] Nuovo Giorn. Bot. Ital. 25: 1–63. *6 pl.* 1918.—The author presents detailed notes on several critical or rare plants of Italy and includes descriptions of the following new species and varieties: *Campanula pseudostenocodon, Convolvulus elegantissimus* Mill. var. *argyreus, Hieracium strictiflorum, Lavatera thuringiaca* var. *silvestris* (L. *sylvestris* Cir.), and *Saxifraga bulbifera* L. var. *pseudogranulata.* [See also next following Entry, 2992.]—*J. M. Greenman.*

2992. Lacaita, C. Piante Italiane critiche o rare. [Rare or critical Italian plants.] Nuovo Gior. Bot. Ital. 25: 97–145. 1918.—In this paper, which is one of a continued series, the writer describes and goes into critical discussion of Italian plants which are rare or difficult. The genera considered are: *Carlina, Centaurea, Cirsium, Echium, Lamium. Cirsium Grandii* is described as a new hybrid species; *C. creticum* var. *Triumfetti* appears as a new variety; *C. spurium* (DC.) and *Carlina acaulis* var. *ramosa* are published as new combinations; and *Centaurea collina* var. *Gouani, Cirsium Triumfetti,* and *C. stabianum* are given as new names. [See also next preceding Entry, 2991.]—*Ernst Artschwager.*

2993. Lauterbach, G. Briträge zur flora von Papuasien. VI. [Contributions to the flora of Papuasia. VI.] Bot. Jahrb. 55: 145–312. Dec. 13, 1918.—The present contribution is a continuation from a previous number of Engler's Botanische Jahrbucher (55: 136. 1917) of the authors results of researches on the flora of New Guinea in coöperation with C. De Candolle, E. Gilg, R. Schlechter, and O. E. Schultz. The scope and character of the contribution are indicated under the names of the cooperating specialists.—*J. M. Greenman.*

2994. Lauterbach, G. Die Rutaceen Papuasiens. [The Rutaceae of Papuasia.] Bot. Jahrb. 55: 221–265. *7 fig.* Dec., 13, 1918.—The author presents a synoptical revision of the Rutaceae of New Guinea recognizing 19 genera and 79 species. Only 3 of the 19 genera are endemic to the island while a relatively large percentage of the species, namely 65 of the total number, are not known to occur outside of Papuasia. The new species described are as follows: *Evodia synaptoneura. E. Peekelii, E. chlorantha, E. micrantha, E. Bismarckiimontium. E. pachypoda, E. Ledermannii, E. coriacea, E. Hunsteinii, E. Schraderi, Melicope sarcococca, M. papuana* (*Fagara papuana* Lauterb.), *M. iboensis, M. trachycarpa, M. rupestris, M. Dielsii, Terminothodia Schultzei-Leonhardi, T. obovata, Acronychia emarginata, A.*

reticulata, *A. reticulata* var. *glabra*, *A. rubescens*, *A. Ledermannii*, *A. cauliflora*, *A. cuspidata*, *Halfordia papuana*, *Hormopetalum gracile*, *H. Werneri*, *H. Pullei*, *Clausenia papuana*, *Luvunga papuana*, *Citrus paludosa*, Hunsteinia n. gen., and *H. papuana*.—*J. M. Greenman.*

2995. MAIDEN, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 8. *P. 201–237, 4 pl.* William Applegate Gullick: Sydney, 1919.—The present part contains descriptions and critical notes on the following species: *Eucalyptus ressellaris* F.v.M., *E. Spenceriana* Maiden, *E. Cliftoniana* Fitzgerald n. sp., *E. setosa* and *E. ferruginea* Schauer, *E, Moorei* Maiden & Cambage, *E. dumosa* A. Cunn., *E. torquata* Luehmann, *E. amygdalina* Labill., *E. radiata* Sieber, *E. numerosa* Maiden, and *E. nitida* Hook. f. The first four species enumerated are copiously illustrated. [See also Bot. Absts. 2, Entries 359 and 1355.]—*J. M. Greenman.*

2996. MARSHALL, E. S. **Notes on Somerset plants for 1918.** Jour. Botany 57: 175–181. 1919. [Concluded from *Ibid.* 57: 154.]—Notes are given on the distribution and structural character of plants in the families from the Solanaceae to the Lycopodiaceae and Characeae (Benthamian system.)—*K. M. Wiegand.*

2997. MARSHALL, E. S. **Barbarea rivularis in England.** Jour. Botany 57: 211–212. 1919.—Plants collected by W. D. MILLER in Somerset County had very small pale yellow flowers and crowded erect pods. These were formerly identified as *B. stricta*, a plant clearly distinct from *B. vulgaris*. A study of Rouy and Foucaud's "Flora de France" showed that the proper name of this plant is *B. rivularis* Martrin-Donas (= *B. stricta* Boreau, non Andrz. nec. Fries.). Syme's figure and Babington's description indicate the typical form of this species, while the material cited above is var. *longisiliquosa* Carion. Marks of distinction between *B. stricta* and *B. rivularis* are noted.—*K. M. Wiegand.*

2998. MASSALONGA, C. **Di alcune Podostemacee del Brasile.** [**The Podostemonaceae of Brazil.**] Bull. Soc. Bot. Ital. 1918: 42–44. *4 fig.* 1918.—The author records four species of *Apinagia* and one of *Mniopsis* from Brazil.—*J. M. Greenman.*

2999. MEYER, RUD. **Echinocereen.** [**Forms of Echinocerus.**] Monatsschr. Kakteenkunde 29: 14–18. *1 pl.* 1919.—Notes are given on the species shown in the plate entitled Echinocereen Gruppe.—*A. S. Hitchcock.*

3000. MILLSPAUGH, CHARLES FREDERICK, AND EARL EDWARD SHERFF. **Revision of the North American species of Xanthium.** Field Mus. Nat. Hist. Publ. Bot. Ser. 4: 9–51. *Pl. 7–13.* 1919.—Twenty-one species of *Xanthium* are found in North America. Of these, 4 are distinctly new species (*Xanthium australe* from Mexico, *X. calvum* from California, *X. cenchroides* from Texas, *X. curvescens* from Vermont) and one other (*Xanthium globosum* Shull from Kansas and Missouri) is described for the first time in accordance with the Vienna Code. Two of the common species, *Xanthium commune* Britt. and *X. canadense* of American authors (not Mill.), are seen to be *X. italicum* Mor. and *X. chinense* Mill. respectively. The Old World *X. strumarium* L. occurs very rarely in North America (Massachusetts and California) and the European *X. orientale* L. is not found here at all. *X. riparium* Lasch of Europe is seen to differ specifically from *X. echinatum* Murr. of North America. *X. bubalocarpon* Bush is identical with *X. speciosum* Kearn. and *X. silphiifolium* Greene likewise equals *X. oviforme* Wallr. A number of additional less well known "species" are merely forms or unstable varieties of older species and hence are reduced to synonymy. The fruiting involucres of each species are illustrated both by photographs and by drawings. Photographs of the type sheets of *X. curvescens*, *X. calvum* and *X. australe* are presented in full-page plates.—*Earl E. Sherff.*

3001. MOORE, SPENCER LE M. **Alabastra diversa. Part XXX. 1 Plantae Rogersianae. IV.** Jour. Botany 57: 86–91. 1919 (cont. from *Ibid.* 56: 212. 1918.)—A further installment of notices concerning, and descriptions of Archdeacon Roger's African Plants, chiefly from

Rhodesia, the northern Transvaal, and a few from Bechuanaland. The following species are described as new:—*Vepris zambesiaca, Canthium dictyophlebum, C. amplium, Fadogia Livingstoniana, Pavetta bechuanensis, P. Harborii, P. cataractarum, P. conflatiflora, Tripteris auriculata*, and *Anisotes Rogersii*. (to be continued).—[See also next following Entries, 3002, 3003.]—*K. M. Wiegand.*

3002. Moore, Spencer Le M. **Alabastra diversa. Part XXX. (2) Thymeleaecea africanae novae vel notari dignae. (3) Pseudactis, Compositarum e tribu Senecionidearum genus novem.**—Jour. Botany **57**: 112–119. 1919. (cont. from *Ibid.* **57**: 91–92. The author prefers to consider the petal-like organs at the throat of the calyx in the Thymeleaceae scales rather than petals pending a more uniform opinion of their homology. Notes are given on *Struthiola, Lachnaea, Gnidia, Lasiosiphon* and *Arthrosolen*. The following species are described as new: *Struthiola Pentheri*, South Africa; *S. concava*, South Africa; *Gnidia kasaiensis*, Belgian Congo; *G. kundelungensis*, Belgian Congo; *G. dumicola*, Angola; *Arthrosolen paludosa*, Belgian Congo; *A. microcephala*, Angola; *A. Gossweileri*, Angola; *Dicranolepis Talbotiorum*, South Nigeria; *D. angolensis*, Angola; *D. Batesii*, Cameroons; *Peddiea Batesii*, Cameroons.—A new genus and species in the Senecio tribe of the family Compositae, *Pseudactis emilioides*, Belgian Congo, is described. [See also next preceding and following Entries, 3001, 3003.]—*K. M. Wiegand.*

3003. Moore, Spencer Le M. **Alabastra diversa. Part XXXI. 1. Miscellanea Africana.** Jour. Botany **57**: 212–219. 1919.—Descriptions, ranges and notes are given of new plants in the families Ericaceae, Asclepiadaceae and Scrophulariaceae. The following species are described as new: *Philippia kundelungensis*, Belgian Congo; *P. congoensis*, Belgian Congo; *Fockea Monroi*, Rhodesia; *Ceropegia degemensis*, Nigeria; *Craterostigma Monroi*, Rhodesia; *C. chironioides*, Belgian Congo; *Ilysanthes Gosswelieri*, Angola; *I. yaundensis*, Cameroons; *Alectra gracilis*, Angola; *Buchnera quadrangularis*, Angola; *B. convallicola*, Belgian Congo; *B. Gossweileri*, Angola; *B. granitica*, Rhodesia; *B. congoensis*, Belgian Congo; and *B. orgyalis*, Angola. [See also next preceding Entries, 3001, 3002.]—*K. M. Wiegand.*

3004. Mousley, H. **The orchids of Hatley, Stanstead County, Quebec.** Ottawa Nat. **32**: 144–147. 1919.—Author gives the habitat of 17 species and one variety of orchids which he found growing within a radius of 1 mile of his residence.—*W. H. Emig.*

3005. Mundt, W. **Cereus aurivillus K. Sch.** Monatsschr. Kakteenkunde **29**: 5. 1919. —Having observed that a flower of *Cereus aurivillus* remained open for 4 days, the author sent it to Weingart for examination.—*A. S. Hitchcock.*

3006. Nakai, Takenoshin. **Notulae ad Plantas Japoniae et Coreae XIX. [Notes on Japanese and Korean plants. XIX.** Bot. Mag. Tôkyô **33**: 1–11. 1919.—Latin descriptions of 28 species of plants from Japan and Korea.—*L. L. Burlingame.*

3007. Nelson, J. C. **The gender of Rumex.** Amer. Bot. **25**: 55–56. 1919.—Names of plants ending in *x*, especially those of classical origin, are usually feminine. *Rumex*, though often considered as feminine is shown to be masculine.—*W. N. Clute.*

3008. Nelson, J. C. **Diamond flower in Oregon.** Amer. Bot. **25**: 65. 1919.—*Ionopsidium acaule* of Portugal noted as naturalized in Oregon.—*W. N. Clute.*

3009. Neuman, L. M. **Rubus acupilosus Lidf. och R. nemoralis var. Ruedensis Lidf. [Rubus acupilosus in Sweden.]** (Swedish.) Bot. Notiser **1918**: 261–264. 1918.—These plants were rediscovered in southern Sweden.—*P. A. Rydberg.*

3010. [Norstedt, C. T. O.] [Swedish rev. of: Gertz, O. **Christopher Rostii Herbarium Vivum i Lund.**] Bot. Notiser **1918**: 214. 1918.

3011. [NORDSTEDT, C. T. O.] [Swedish rev. of: OSTENFELD, C. H. Bemerkninger om danske Traeer og Buskes Systematik og Udbredelse I. Vore Aelme-Arter. (Remarks on the systematics and distribution of Danish trees and shrubs. I. Our species of Elms.)] Dansk Skovfr. Tidsk. 1918: 421–442. 1918.] Bot. Notiser 1919: 102. 1919.

3012. PAMPANINI, R. Contributo alla conoscenza della flora della Cirenaica. [Contribution to the knowledge of the flora of Cirenaica.] Bull. Soc. Bot. Ital. 1918: 13–16. 1918.

3013. PENNELL, FRANCIS W. Scrophulariaceae of the local flora. II. Torreya 19: 143–152. 1919. [Continued from Torreya 19: 107–119.]—This installment takes up the tribes Limoselleae, Gratioleae and Antirrhineae, containing the genera *Limosella* (1 species), *Gratiola* (5 species, 1 variety), *Mimulus* (4 species), *Ilysanthes* (2 species, 1 variety) *Hemianthus* (1 species) and *Linaria* (2 species). Notes are added on synonymy and distribution, with keys to the species of each genus. Two new varieties are described: *Gratiola aurea* Pursh var. *obtusa*, and *Ilysanthes dubia* (L.) Barnhart var. *inundata*, both originally collected along the shores of the Delaware River. Two new combinations are proposed: *Ilysanthes inaequalis* (Walt.) which is regarded as synonymous with *I. anagallidea* (Michx.) Rob.; and *Hemianthus micranthus* (Pursh), based on *Herpestis micrantha* Pursh = *Micranthemum micranthemoides* (Nutt.) Wettst. The name *Gratiola viscidula* is proposed to replace *G. viscosa* Schwein. 1824, invalidated by *G. viscosa* Hornem. 1807. The section *Leptoplectron* is established for that part of the genus *Linaria* which includes *L. canadensis* (L.) Dumont.—*J. C. Nelson.*

3014. PENNELL, FRANCIS W. Notes on plants of the southern United States. V. Bull. Torrey Bot. Club 46: 183–187. 1919.—*Dasystephana tenuifolia* (Raf.) comb. nov.; *Acerates hirtella* sp. nov.; *Monarda punctata villicaulis* subsp. nov.; and *Monarda punctata immaculata* subsp. nov. are discussed, together with their diagnostic characters. Records are also given for various other species.—*P. A. Munz.*

3015. PUGSLEY, H. W. Notes on British Euphrasias. I. Jour. Botany 57: 169–175. 1919.—After a study of the British Euphrasias extending over a period of twenty years, the notes contained in this series of papers are written. The validity of some of Wettstein's groups is questioned. The British plant previously considered to be *E. minima* Jacq. is here shown to be distinct from that species, and is described as new under the name *E. confusa*. *E. hirtella* Jord., a plant of the continent, is recorded for the first time as a British plant, having been found at Llanberis in North Wales. A discussion of the distinguishing characters of this species is given.—*K. M. Wiegand.*

3016. ROCK, JOSEPH F. Cyrtandreae Hawaiienses, Sect. Microcalyces Hillebr. Amer. Jour. Bot. 6: 203–216. *4 pl.* 1919.—This is the fourth and final paper in the author's monograph on Hawaiian species of *Cyrtandra,* and takes up Hillebrand's section *Microcalyces.* There are described five species, of which *C. Giffardii* is new; and three varieties, of which *C. laxiflora* Mann var. *rhizantha* is new, and *C. laxiflora* Mann var. *grandifolia* and *C. polyantha* C. B. Clarke var. *ambigua* are new combinations. An addendum to section *Cylindrocalyces* is presented, in which are described eleven species, of which *C. limosiflora, C. montis Loa, C. ramosissima* and *C. Hashimotoi* are new; one variety, and one form, a new one, *C. paludosa* var. *brevicalyx* Hillebr. forma *linearis.*—*E. W. Sinnott.*

3017. SALMON, C. E. Norfolk notes. Jour. Botany 57: 190–192. 1919.—Critical notes are given on the occurrence and distinguishing characters of species in *Fumaria, Nasturtium, Polygala, Cerastium, Geranium, Rhamnus, Trifolium, Agrimonia, Sedum, Callitriche, Sium, Sambucus, Valeriana, Carduus, Scrophularia, Symphytum, Glaux, Rumex, Mercurialis, Potamogeton, Scirpus, Carex, Calamagrostis, Ammophila, Glyceria, Osmunda,* and *Chara.* The paper is based on a trip to the villages of Hemsby and Ranworth in 1915.—*K. M. Wiegand.*

3018. Schick, C. **Saaterfolge und Kulturbeobachtungen im Jahre 1918. [Results of seeding and cultural observations in 1918.]** Monatsschr. Kakteenkunde 29: 13–14. 1919.

3019. Schlechter, R. **Die Ericaceen von Deutsch-Neu-Guinea. [The Ericaceae of German New Guinea.]** Bot. Jahrb. 55: 145–194. *13 fig.* Dec. 13, 1918.—The author presents a continuation of his taxonomic treatment of the Ericaceae of German New Guinea and includes descriptions of the following new plants: *Rhododendron fuchsioides, R. podocarpoides, R. neriifolium, R. rarum, R. Dielsianum, R. laureola, R. warianum, R. melantherum, R. dasylepis, R. Schultzei, R. Christi* Förtser var. *loniceroides, R. maboroense, R. gardenia, R. Moszkowskii, Diplycosia edulis, D. Schultzei, D. rufescens, D. Ledermannii,* Disiphon n. gen., *D. papuanum, Vaccinium Finisterrae, V. sessiliflorum, V. rariflorum, V. Ledermannii, V. sanguineum, V. myrsinoides, V. Schultzei, V. torricellense, V. filipes, V. blepharocalyx, V. stenolobum, V. longiporum, V. scandens, V. grandibracteatum, V. appendiculatum, V. daphniphyllum, Paphia viridiflora, P. stenantha, Dimorphanthera albiflora, D. brevipes, D. Kempteriana, D. torricellensis, D. kaniensis, D. racemosa, D. latifolia,* and *D. velutina.—J. M. Greenman.*

3020. Schlechter, R. **Eine neue papuasische Burmanniacee. [A new Papuasian Burmanniacea.]** Bot. Jahrb. 55: 202–203. *1 fig.* Dec. 13, 1918.—*Thismia appendiculata* is described and illustrated from specimens collected in northeastern New Guinea. Hitherto the only known representatives of this family in New Guinea have been species of *Burmannia* and *Gymnosiphon.—J. M. Greenman.*

3021. Schulz, O. E. **Die bisher bekannten Cruciferen Papuasiens. [The known Cruciferae of Papuasia.]** Bot. Jahrb. 55: 266–272. *1 fig.* 1918.—A very few species of Cruciferae have been collected in New Guinea, and these, with one exception, belong to the two wide spread genera *Nasturtium* and *Cardamine.* In *Nasturtium* four species are listed all of which are described as new: *N. Schlechteri* (related to *N. palustris*), *N. hybospermum, N. homalospermum* and *N. Peekelii.* The second and third are of the aggregate *N. indicum,* while the last is related to *N. eustyle* and *N. sarmentosum.* One variety *N. homalospermum* var. *macrocarpum* is described as new. One species of Cardamine is listed, which is new: *C. papuana* (Lauterb.) (= *C. africana* L. subsp. *borbonica* (Pers.) O. E. Schulz var. *papuana* Lauterb.). Besides the above, the cruciferous species *Papuziella minutiflora* Ridl. is found in New Guinea. Mention is made of *Brassica integrifolia* (Wets.) O. E. Sch. var. *timoriana* (DC.) O. E. Sch. collected by Ledermann on the Eastern Caroline Islands.—*K. M. Wiegand.*

3022. Sipkes, C. **Opmerkingen betreffende in ons land voorkomende Orchidaceae. [Remarks on the Orchidaceae occurring in our country (Holland).]** Nederland. Kruidkundig Arch. **1918**: 145–154. May, 1919.—Treatment with critical note of the orchids of Holland comprised in the genera *Ophrys, Orchis, Anacamptis, Herminium, Gymnadenia, Plantanthera, Epipactis* Adans., *Listera, Neottia, Goodyera* and *Sturmia.* Eight new varieties of *Orchis Morio,* one of *Orchis latifolia,* one of *Gymnadenia conopea,* two of *Platanthera chlorantha,* one of *Epipactis ochroleuca* and one of *Listera purpurascens* are described.—*J. A. Nieuwland.*

3023. Standley, Paul C. **A new Nyctelea name.** Proc. Washington [D. C.] Biol. Soc. 32: 143. 1919.—*Nyctelea ambigua* (Nutt.) Standl. is proposed for *Nyctelea nyctelea* (L.) Britton. —*J. C. Gilman.*

3024. Vaupel, F. **Keimkehr. [Return home.]** Monatsschr. Kakteenkunde 29: 1–5. 1919.—After an absence of over four years, the author returns to find his specimens of Cactaceae in a deplorable condition. He records notes on several of the surviving species.—*A. S. Hitchcock.*

3025. Vaupel and Mellin. **Januar-Sitzung der Deutschen Kakteen-Gesellschaft. [January session of the German Cactus Society.]** Monatsschr. Kakteenkunde 29: 19–20. 1919.—Vaupel exhibited a plant of *Echinopsis multiplex cristata* bearing a normal shoot.—*A. S. Hitchcock.*

3026. Verdoorn, Inez C. **The genus Fagara as represented in the South African herbaria.** Jour. Botany 57: 201–205. 1919.—A brief historical sketch is given of *Fagara* as a genus, and its relation to *Zanthoxylum*. Engler reverted to the two Linnean genera as distinct, and this arrangement has been adopted by all subsequent authors. Harvey divides the South African specimens into 2 species, while Sim reduces them to a single variable one. The present author gives 3 species, 1 of which, *Fagara capensis* Thunb., includes the 2 of Harvey, while the other 2 are new. The new are *F. Thorncroftii*, Transvaal, and *F. Davyi*, Transvaal, Swaziland, Zululand, and Transkei.—*K. M. Wiegand.*

3027. Weingart, Wilh. **Die Blüte des Cereus aurivillus K. Sch.** [**The flower of Cereus aurivillus K. Sch.**] Monatsschr. Kakteenkunde 29: 6–10. *1 pl., 1 fig.* 1919.—The author records the first description of the flower. The species belongs to *Cleistocactus* Berger and is related to *C. Monvilleanus* Weber and *C. icosagonus* P. DC. The honey chamber is described and compared with that of *C. colubrinus*, another species of *Cleistocactus*.—*A. S. Hitchcock.*

3028. Weingart, W. **Kleine mitteilungen.** [**Minor contributions.**] Monatsschr. Kakteenkunde 29: 10. 1919.—(1) To avoid mistakes, the author states that, in his previous article on *Phyllocactus chiapensis* (*Ibid.* 28: 121. 1918), by "purple" he meant the color of Cassius' gold-purple, and that the sepals should be described as narrowly triangular instead of "spiessförmig." (2) Spineless *Opuntia* obtained from Luther Burbank produced spines at Erfurt. Spineless specimens of *O. ficus-indica* from Sicily produced spines when grown at Erfurt. The author thinks it doubtful if spineless forms should be recommended for fodder on sterile soil. [See next following Entry, 3029.]—*A. S. Hitchcock.*

3029. Weingart, W. **Kleine Mitteilungen.** [**Minor contributions.**] Monatsschr. Kakteenkunde 29: 18–19. 1919.—(1) Differences between *Cereus Gonzalezii* Web. and *C. tinella* Web. are given. (2) Concerning *Cereus acanthosphaera* Wgt. (op. cit. 24: 83. 1914) the author adds that lenticels take the place of stomata. (3) Indigo in the parenchyma (op. cit. 84) was not demonstrable, the light blue tinge coming from the packing. (4) A previously mentioned *Cereus* from Zacapa (Guatemala) is discussed (see op. cit. 26: 76. 1916). (5) The author gives a note on *Cereus rostratus* Lem. (see op. cit. 19: 186. 1909). [See also next preceding Entry, 3028.]—*A. S. Hitchcock.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

Burton E. Livingston, *Editor*

3030. Anonymous. **Rubber substitute from German plants.** Sci. Amer. Suppl. 87: 237. 1919.—The sap of certain Euphorbiaceae has been shown to contain a rubber-like constituent which can be isolated.—*Chas. H. Otis.*

3031. Anonymous. **The vegetable oil industry of Japan.** Sci. Amer. Suppl. 87: 229. 1919.

3032. Anrep, A. **Investigation of peat bogs in Canada.** Jour. Amer. Peat Soc. 12: 84–88. 1919.—Ten bogs were investigated with a view to their utilization. Their combined area is 4902 acres. Their depth varies from 3 to 30 feet. Some of the peat in them is suitable for fuel and some of it for litter.—*George B. Rigg.*

3033. Barnard, Joseph E. **The limits of microscopy.** Jour. Roy. Microsc. Soc. 1919: 1–13. *1 fig.* 1919.—It is shown that a clear conception of magnitudes involved and the relation of the microscopic resolution to wave-lengths of light and to molecular dimensions is necessary. An object may be visible to the unaided eye, even though one of its dimensions is far below the range of microscopic resolution. By the use of a solid cone of illumination the structural elements of the order of 3μ can be resolved apart, and by the use of oblique light this interval can be halved. The resulting image bears only a quantitative relation

to structure. Visibility may be secured under most favorable conditions of a particle of the order of 5 micromillimetres in diameter, but the resulting images of objects, ranging in size from the limits of resolution to the limits of visibility are not such that any idea of form or condition can be established. It is merely a proof that the objects exist; other physical tests must be applied to approximately determine their size and state. Therefore the limits of resolution are dependent on the effective numerical aperture of the observing system and the mean wave-length of the illuminant. The limits of resolution of two separate objects may be taken as the absolute limit of resolution for all isolated objects that can be seen and observed as definite entities. The limits of visibility are dependent on the difference of refractive index between the object and the medium in which it lies, and on the intensity of the illumination. By detailed description of the ultra microscope it is shown that the effectiveness of the instrument is dependent on the concentration of a great quantity of light on a small area, so that only a few of the particles in the field of view are illuminated. The illumination of particles in depth is controlled to ensure that none above or below the focal plane of the observing objective are brought into view.—*Julia Moesel.*

3034. Blunck, Gustav. **Verwendung des Glyzerinersatzmittels "Glyzinal" in der Mikroskopie. [Glycerin substitute "Glyzinal" in microscopy.]** Zeitschr. Wiss. Mikrosk. **35**: 249–251. 1919.—A commercial product similar in some respects to glycerin, said to be based on a mixture of dipyridinbetain-NaCl and dipyridin-$CaCl_2$. Recomended as clearing and preserving fluid.—*H. G. Barbour.*

3035. Chamberlain, Edward B. **A herbarium note.** Bryologist **22**: 39–40. 1919.—Loose-leaf binders are advised for the preservation of small collections and exsiccatae; the specimen-envelopes are pinned directly to the sheets.—*Edward B. Chamberlain.*

3036. Conard, Henry S. **Relation of the community to the preservation of wild plants.** Rept. Iowa State Hortic. Soc. **53**: 385–390. 1918.—Calls attention to the wealth of material among our native plants for park purposes. The Atlantic seashore is gilded with goldenrods like *Solidago sempervirens*, the salt marshes with Sabbatias, nowhere is greater beauty displayed than on the hills and prairies of Iowa.—*L. H. Pammel.*

3037. Coupin, H. **Sur le montage de quelques préparations microscopiques. [On the mounting of some microscopic preparations.]** Rev. Gén. Bot. **31**: 109–114. 1919.—Author reviews objections to the use of the ordinary mounting media for certain objects, and recommends several new ones for which excellent results are claimed. Stained sections may be mounted directly from water, alcohol or glycerine in a medium made up as follows: 0.8–1 per cent aqueous solution of $HgCl_2$, 35 cc.; gum arabic, 30 grams; glucose, 10 grams. Filter. Seal mount.—For mounting pieces of epidermis: gum arabic, 10 grams; glucose, 5 grams; water, 10 cc.; crystal of thymol or few drops of formol as preservative.—For unicellular algae: 0.8–1 per cent aqueous solution of $HgCl_2$, 35 cc.; glucose, 10 grams; gum arabic, 30 grams; ammoniacal copper chloride, 1 gram. Filter.—For filamentous algae: 0.4 per cent aqueous solution of $HgCl_2$., 500 cc.; gelose, 5 grams; ammoniacal copper chloride, 1 gram. Boil and cool. Melt a piece on the slide and just before it cools add algae and cover. Seal.—For pollen grains: vaseline oil.—*L. W. Sharp.*

3038. Curtiss, C. F. **Forest parks and their relation to the rural community.** Rept. Iowa State Hortic. Soc. **53**: 363–364. 1918.—Suggests that the fee for hunters licenses be utilized for park purposes and game reserves.—*L. H. Pammel.*

3039. Davidson, S. C. **Coal from peat.** Jour. Amer. Peat Soc. **12**: 16. 1919.—British patent covering a method of preparing synthetic coal from peat.—*George B. Rigg.*

3040. Georgi, J. **Zur Verwendung flächenmessender Instrumente in der Mikrotechnik. [Surface-measuring instruments in microscopic technique.]** Zeitschr. Wiss. Mikrosk. **35**: 175–188. 1919.

3041. Horchem, B. J. What was accomplished in regard to state parks in the 37th General Assembly. Rept. Iowa State Hortic. Soc. 53: 378–379. 1918.—A brief history of the Iowa legislation for the creation of state parks.—*L. H. Pammel.*

3042. K[irchner], O. [Rev. of: Kaiserling, Carl. Die mikrophotographischen Apparate und ihre Handhabung. (Microphotographical apparatus and their use.) *60 illustr. Stuttgart.*] Zeitschr. Pflanzenkrankh. 29: 48. 1919.—This volume published as vol. 4 of the Handbook of Microscopic Technique deals with the microscope, photographic apparatus, source of illumination, and related subjects.—*H. T. Güssow.*

3043. Krugenberg, B., and E. Th. Tielemann. Weitere Mitteilungen über die Färbung WEP (Dioxychrom) und über zwei neue Trioxychrome. [Further report on "WEP" (dioxychrome) stain and two new trioxychromes.] Zeitschr. Wiss. Mikrosk. 35: 170–174. 1919.

3044. Lazell, Fred J. Action needed in conservation. Rept. Iowa State Hortic. Soc. 53: 353–356. 1918.—Urges the importance of creating state parks in Iowa.—*L. H. Pammel.*

3045. Lees, James H. Park sites along the Des Moines valley. Rept. Iowa State Hortic. Soc. 53: 367–371. 1918.—Gives an account of places along the Des Moines river suitable for park purposes. He begins with Tuttle Lake, following the river down to its mouth, giving an account of the geology of the region.—*L. H. Pammel.*

3046. Lindet. [Rev. of: Rolet, S. Plantes à parfum et les aromatiques. (Perfume plants.) *432 p., 100 fig.* 1918.] Compt. Rend. Acad. Agric. France 5: 403–404. 1919.—A brief review of this book and a discussion of the availability of much of France for the perfume industry.—*E. A. Bessey.*

3047. Mayer, P. Über die sogenannten Sublimatkristalle in mikroskopischen Präparaten. [So-called sublimate crystals in microscopic preparations.] Zeitschr. Wiss. Mikrosk. 35: 161–169. 1919.

3048. McNider, Mrs. C. H. What the Mississippi Valley national park would mean to Iowa. Rept. Iowa State Hortic. Soc. 53: 360–363. 1918.—Gives an account of the yellow lotus (*Nelumbo lutea*) and the scenic beauty of the region about McGregor, Iowa.—*L. H. Pammel.*

3049. Naumann, Einar. Ein einfaches Zeigerokular. [Simple demonstration ocular. Zeitschr. Wiss. Mikrosk. 35: 248. 1919.

3050. Naumann, Einar. Über die okulare Begrenzung des mikroskopischen Gesichtsfeldes. [Ocular limitation of microscopic field of vision.] Zeitschr. Wiss. Mikrosk. 35: 241–242. 1919.

3051. Naumann, Einar. Über die Einteilung des Gesichtsfeldes beim Zählen mikroskopischer Körper. [Division of field of vision for microscopic counting.] Zeitschr. Wiss. Mikrosk. 35: 245–247. 1919.—A "universal" counting device. By means of a reflector any sort of counting field outside of the microscope is thrown in through the condenser.—*H. G. Barbour.*

3052. Orr, Ellison. Conservation and education. Rept. Iowa State Hortic. Soc. 53: 351–353. 1918.—Gives a brief résumé of the proposed national park at McGregor, Iowa, and the importance of preserving the natural beauty, wild animal and plant life of Iowa. Calls attention to the occurrence of the balsam fir on the Yellow River in Allamakee county, Iowa. —*L. H. Pammel.*

3053. Osborn, C. C. Peat in the Dismal Swamp, Virginia and North Carolina. United States Geol. Surv. Bull. 711: 41–59. *Pl. 4–6 (including 1 folded map).* Nov., 1919.—This seems to be largely a compilation from the writings of previous investigators, some of

which are not specifically mentioned. Some of the commoner plants are listed, and two of the four half-tone illustrations show vegetation. The principal original contribution is the description and analysis of peat samples from about half a dozen localities in the swamp. The second half of the paper deals with the uses of peat in general.—*Roland M. Harper.*

3054. Osborn, C. C. **Possibilities of peat.** Jour. Amer. Peat Soc. **12**: 7–16. 1919.—Peat is used for fuel, fertilizer, fertilizer filler, and stable litter. It is also used as a source of gas, charcoal and coke, in the preparation of surgical dressings, and in the preparation of substitutes for wood and cotton and woolen cloth, also as an absorbent for the uncrystallized residues of beet sugar refineries and in the manufacture of stock feed. Only a small fraction of the total peat available in the United States is now being utilized.—*George B. Rigg.*

3055. Shimek, B. **Conservation of natural scenery in Iowa.** Rept. Iowa State Hortic. Soc. **53**: 372–375. 1918.—The preservation of these places will prevent erosion. Needed to supply moisture for the atmosphere. These places should also be preserved for scientific purposes.—*L. H. Pammel.*

3056. Shimek, B. **Iowa's natural parks.** Rept. Iowa State Hortic. Soc. **53**: 364–367. 1918.—A list of places in the state that should be set aside for state parks.—*L. H. Pammel.*

3057. Small, Mrs. W. B. **A natural park site.** Rept. Iowa State. Hortic. Soc. **53**: 371–372. 1918.—Discusses the Devil's Backbone area in Delaware county, Iowa.—*L. H. Pammel.*

3058. Taylor, Mrs. H. J. **Conservation of life through city parks.** Rept. Iowa State Hortic. Soc. **53**: 376–378. 1918.—The waste of natural resources has led to emphasis upon conservation.—*L. H. Pammel.*

3059. Triepel, H. **Ein neues Modellierverfahren.** [New modelling method.] Zeitschr. Wiss. Mikrosk. **35**: 89–94. 1919.

3060. Turner, C. **Distillation of peat.** Jour. Amer. Peat Soc. **12**: 101–102. 1919.—British patent 117,645, 1917 covers the distillation of peat. Among the products are ammonia, methyl alcohol, acetone, acetic acid, pyridine, mono-phenols, guiacol, cresol and other phenols, a petol-like spirit, other neutral acids, and paraffin waxes.—*George B. Rigg.*

3061. Willmarth, C. A. **Willmarth peat fuel process.** Jour. Amer. Peat Soc. **12**: 113–122. **1919.**

INDEX TO AUTHORS' NAMES IN VOLUME III

(*References are to Entry numbers; an asterisk before a number signifies that the entry referred to is by citation alone—no abstract.*)

INFORMATION CONCERNING BOTANICAL ABSTRACTS

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ENTRIES 1-1853

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

1. AMOS, ARTHUR. **The difficulties of growing red clover. Clover sickness, and other causes of failure.** Jour. Roy. Agric. Soc. England 79: 68-88. *5 fig.* 1918.—Failure of red clover crops commonly known as "clover sickness" is held to be due to one of two diseases, either eelworm disease or stem rot disease of clover. These two common diseases are described and leguminous crops attacked by each given. The remedy advised is to avoid all susceptible crops for a period of years. The author states that the evidence in support of toxic substance being excreted by the previous clover crop and causing clover sickness, is scant.—*J. J. Skinner.*

2. ANONYMOUS. **The food value of the potato crop.** Jour. Bd. Agric. [London] Supplem. 18: 23-27. 1919.—Analyses of the composition of 247 samples of potatoes grown in the United Kingdom in 1917 gave the general averages of 22.09 per cent dry matter and 0.327 per cent nitrogen. These are appreciably lower than the Continental averages as quoted by König, viz., 25.0 per cent and 0.336 per cent respectively, and slightly higher than the average dry matter content (21.7 per cent) commonly given for American potatoes.—No significant difference in composition was indicated between the late or maincrop varieties and the early varieties. A consistent difference representing probably, in the main, the effects of difference of rainfall was found between the potatoes grown in the eastern and in the western halves of the country as arbitrarily divided by longitude 2 W, the averages being 22.72 per cent and 0.331 per cent, and 21.79 per cent and 0.337 per cent respectively.—*M. B. McKay.*

3. ANONYMOUS. **Peat soils in Iowa.** Jour. Amer. Peat Soc. 12: 201-202. 1919.—There are two classes of peat soils in Iowa, the shallow (not over 3 feet) and the deep. Drainage by tiling is recommended. Corn and small grain crops usually do not do well on newly reclaimed peat. For forage a mixture of timothy and alsike clover is best.—*G. B. Rigg.*

4. ANONYMOUS. **Wart disease of potatoes order, 1918, and inspection of immune crops.** Jour. Bd. Agric. [London] Supplem. 18: 114-115. 1919.—See Bot. Absts. 4, Entry 1222.

5. ANONYMOUS. **Agricultural possibilities of the Sahara.** Sci. Amer. Supplem. 87: 297. 1919.

6. Anonymous. **Killing weeds with live steam.** Sci. Amer. 120: 599, 613–614. 1919.

7. Anonymous. **Desert plants as fodder.** Sci. Amer. 121: 220. 1919.

8. Anonymous. [Rev. of: Denham, H. J. **Gossypium in pre-Linnaean literature.**—Botanical Memoirs No. 2. 8°, *24 p.* University Press: Oxford.] Jour. Botany 57: 325–326. 1919.

9. Anonymous. **Gramineas de pradera.** [**Meadow grasses.**] Informacion Agric. [Madrid] 9: 289–290. *2 fig.* 1919.—Uses and manner of cultivating "fleo de prados" (*Phleum pratense*) and *Poa pratensis.*—*John A. Stevenson.*

10. Anonymous. **El sorgo forrajero.** [**Sorghum for forage.**] Revista Agric. [Mexico] 3: 369–373. *2 fig.* 1919. [Reprinted from "Los Annales de la Sociedad Rural de Argentina." Aug., 1918.]—*John A. Stevenson.*

11. Anonymous. **The Uba cane in South Africa.** Tropical Life 15: 154–155. 1919. [Excerpts of pamphlets issued by The Chilean Nitrate Propaganda and Hawaiian Sugar Planters' Assoc. Exp. Sta.]—Sugar cane is being successfully grown in Natal throughout the country extending from Port Shepstone on the South Coast to the Umfolosi River on the North Coast. The average mean temperature of this region is 77°F., the average annual rainfall about 40 inches. The Uba cane (*Saccharum officinale*) has been known to root to a depth of 12 feet. This deep-rooting habit enables the cane to withstand high winds and the recurring periods of drouth which are sometimes destructive to the shallow rooting varieties. Uba cane although introduced into Mauritius from Brazil in 1869 probably originated in India. Analysis of Uba cane shows a large percentage of fibre but a good quality of juice, the average and maximum being as follows in each case: Total solids in juice, 20.32 and 22.70 per cent; Sucrose, 18.61 and 20.79 per cent; Purity, 91.60 and 91.20 per cent.—*H. N. Vinall.*

12. Anonymous. **Los triboles.** [**Clovers.**] Informacion Agric. [Madrid] 9: 271–272. *3 fig.* 1919.—The uses, soils to which it is adapted, and rate of seeding, of white clover (trébol blanca), alsike clover (tróbol hibrido), and red clover (tróbol violeta).—*John A. Stevenson.*

13. Anonymous. **Textile fibers in Germany.** Sci. Amer. Supplem. 87: 217. 1919.—Mention is made of the use of fibers from nettles and coniferous woods for textile manufacture. —*Chas. H. Otis.*

14. Anonymous. **Sorghum. A plant of value as a source of food and industrial raw material.** Sci. Amer. Supplem. 88: 60–61. *Fig. 1–9.* 1919. [Translated from *La Rousse Mensuel.*]

15. Anonymous. **The high price of sugar.** Tropical Life 15: 100. 1919.—A compilation giving discussions regarding the present shortage of sugar. The crop for the different sugar producing countries is listed for 1917–18 and for 1918–19 and a deficiency of nearly 800,000 tons is indicated. The totals (tons) were as follows 1917–18: cane sugar, 12,346,820; beet sugar, 4,866,789; total 17,213,609. 1918–19: cane sugar, 12,048,866; beet sugar, 4,390,092; total, 16,438,958.—*H. N. Vinall.*

16. Anonymous. **The world and its food supplies.—Part XII.** Tropical Life 15: 115–116. 1919.—A compilation showing the remarkable expansion in the uses of the soy bean (*Soja max*), especially as a human food. Figures are given for the exports of soy beans and soybean products from Manchuria. In 1907 the annual exports did not exceed 120,000 tons, while in 1909 they had increased to 700,000 or 800,000 tons and the British consul at Newchang estimated the export of the bean in all its forms from that port in 1909 as 1,300,000 tons. The various uses of the soy bean in commerce are listed.—*H. N. Vinall.*

17. Anonymous. **New Zealand flax.** Kew Bull. Misc. Inf. [London] 1919: 169–177. *Pl. 1–3.* 1919.—This is an account of the attempts to grow New Zealand flax [*Phormium tenax*] on a commercial scale in the British Isles, including a statement by Lord Ventry of the experiments conducted in Ireland in the culture of this plant.—*E. M. Wilcox.*

18. Anonymous. **Sugar beet juiceries proposition.** Australian Sugar Jour. 11: 370–371. 1919.—A committee appointed by the Minister of Agriculture reported on the practicability of the establishment in districts remote from the Maffra Sugar Factory of juicery plants for the extraction of raw sugar from beets, which could then be sent to Maffra to be refined. It was reported technically possible for 75 to 85 per cent of the sugar to be extracted by crushing the beets and evaporating the water from the crude juice. This product could be transported long distances and would keep for periods extending to 3 years. It was found not to be profitable under the present conditions.—*C. Rumbold.*

19. Anonymous. **Soy bean milk.** Sci. Amer. Supplem. 87: 233. 1919.

20. Anonymous. **Salt and the growth of coastland plants.** Agric. News [Barbados] 18: 321. 1919.—The author discusses the toleration of salt exhibited by tropical crops such as sugar-cane, cotton and coconuts, which are cultivated on coastlands in the West Indies.—*J. S. Dash.*

21. Bano, Jose de. **El efecto del amacollamiento de los cereales respecto de su producto. [Effect of tillering of cereals on yield.]** Revista Agric. [Mexico] 4: 218–219. *2 fig.* 1919.—Heavy tillering of cereals in tropical regions with consequent irregularity in time of maturity results in lowered yields. This condition is especially marked in Mexico.—*John A. Stevenson.*

22. Barber, C. A. **Studies in Indian sugar canes, No. 4. Tillering or underground branching.** Mem. Dept. Agric. India (Bot. Ser.) 10: 39–153. *Pl. 37.* 1919.—A description is given of the different varieties of sugar cane. The varieties vary greatly in the rate of maturing and the number of canes produced per plant. Tables are presented showing the relative rate of maturing. The branching of various groups, from the wild saccharums to the thick tropical canes is of similar nature but differs in degree. A discussion of morphological characteristics is given together with illustrations, showing the characteristics of the various varieties.—*J. J. Skinner.*

23. Barber, C. A. **Studies in Indian sugar canes, No. 5.** Mem. Dept. Agric. India (Bot. Ser.) 10: 155–175. *Pl. 8.* 1919.—The paper deals with the results of testing the suitability of sugar cane varieties for different localities. There is a tendency of each variety to grow better near its native habitat.—A special study was made of the following varieties: *Saretha*, *Chin*, *Khari*, *Pansahi*, *Chynia*, *Baroukha*, and *Mungo.*—*J. J. Skinner.*

24. Barber, C. A. **The growth of the sugar-cane. II.** Internat. Sugar Jour. 21: 545–548. *Fig. 1–4.* 1919.—Sugar cane is not propagated by seed because the flowering of the plant is uncertain, the seed so small as to be difficult to handle and the time between sowing seed and reaping varies in India from 16 to 18 months, while a "set" will produce its ripe canes in about 12 months. An even field cannot be expected from seed-grown canes, while plants produced by "sets" are exactly like their parents. The second period of growth consists of the elongation of the stems by the formation of much larger joints than those found under ground. This period closes with the formation of flowers and seed. Buds and root-eyes are formed in each joint for which reason any joint of cane planted will produce a new plant. Branching and rooting of the aerial portion of the plant is repressed by light and by the lack of moisture. In many moist climates where the rain collects in the bases of the old leaves, shooting and rooting start and the practice is to strip off the dying leaves at stated intervals. When canes fall to the ground similar branching starts and various means are taken to prevent "lodging." In the Godavari district of the Madras Presidency where cane reaches a height of 25 feet and cyclones are frequent, an intricate system of binding the stalks in bunches around bamboo poles is used.—*C. Rumbold.*

25. Barber, C. A. The growth of sugar cane. III. Internation. Sugar Jour. **21**: 601–603, *2 pl., 4 fig.* 1919.—Deals with the branching of the plant. [See also next preceding Entry, 24.]—*E. Koch.*

26. Beauverie, J. Revue d'agronomie. [Review of agronomy.] Rev. Gen. Sci. Pures et Appliquées **30**: 370–384, 411–418. 1919.—In this interesting essay, which is much more than a review of agronomy, the author first indicates that the faculties of science in the universities should be, to a greater extent than they now are, the sources of knowledge to be applied to the world's most pressing question, that of food. He touches upon agricultural meteorology, discusses the more recent papers on the bacteria fixing nitrogen in soil, protozoa and soil-fatigue and their treatment, nitrate and phosphate fertilizers. The physiologist will appreciate the discussion of recent work on the relations of magnesium and calcium to the normal development of plants, in the course of which it is suggested that a lack of available magnesium may be connected with the abnormal condition known as chlorosis, and that our conceptions of the rôle of calcium may be faulty because water cultures in glass may contain calcium in unsuitable form or amount. There is a brief consideration of the new Alsatian sources of potash for fertilizers, but no discussion of the rôle of potassium in plant metabolism. The author summarizes the slight and contradictory results of experiments with radioactive substance applied to laboratory or plat cultures, and passes to a consideration of recent studies of animal nutrition.—*G. J. Peirce.*

27. Beverley, J. Sunflower notes. New Zealand Jour. Agric. **18**: 356–357. 1919.—The author recommends the growing of sunflowers for oil as well as using the seed for poultry and cattle. The large early maturing single-head sunflower is preferred over those plants producing many heads because of the difficulty in harvesting the seed from the latter. He advises that the stems be chopped up and used as fertilizer on the land as they contain about 5 per cent potash.—*I. S. Cook.*

28. Biggar, H. Howard. The old and the new in corn culture. U. S. Dept. Agric. Yearbook 1918: 123–137. *4 pl., 10 fig.* 1919.—The article gives quite a detailed description of corn culture among the Indians, naming ten of the kinds of corn developed and cultivated, describing the methods of seed testing, the hill method of planting, the location and preparation of the fields, and the tools used. The description of seed selection, storage, correlation of development with prairie plants, and food products; all indicate that the Indian had an almost uncanny knowledge of corn culture and its utilization. Corn culture has been a very important factor in the development of Indian civilization. The article closes by showing the very great importance of corn in the agricultural and industrial development of the United States. Corn had a vital influence in the war. Its multiplicity of uses, its high productiveness, its value, and its adaptability makes the importance of corn, directly and indirectly in world affairs, more and more manifest each decade.—*C. J. Shirk.*

29. Birckner, Victor. Simple method of measuring the acidity of cereal products: its application to sulphured and unsulphured oats. Jour. Agric. Res. **18**: 33–49. 1919.—The imporant feature of the new method is the use of ice water for the extraction of the material. By this method the amount of acid present in oat (*Avena*) kernels does not change markedly during the early stages of spoilage. The Schindler method is deficient in that alcohol may be present during the extraction and subsequent titration.—If oats are sulfured their acidity is increased; but by the ice water method they show no increased acidity upon prolonged standing in the ground state, due to destruction of acid-forming ferments by the sulphur fumes; by the Schindler method pronounced increases occur.—Ice water extracts of oats or maize filtered and kept 24 hours at 1° or 2° undergo no change in acidity if not neutralized; but if neutralized a new formation of acid takes place, notwithstanding the low temperature.—*D. Reddick.*

30. Blackshaw, G. N. Fertilizers for maize and tobacco. Season 1919–1920. Rhodesia Agric. Jour. **16**: 452–459. 1919.

31. Blair, W. S. **Orchard cultivation.** Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 18–27. 1919.

32 Boase, W. N. **The strongest and most durable fiber. The cultivation, preparation, spinning, weaving and history of flax.** Sci. Amer. Supplem. 88: 6-7. 42–43. 1919.[From *Jour. Roy. Soc. Arts* (London)].

33. Bolley, H. L. **Official field crop inspection.** Science 50: 193–199. Aug., 1919.

34 Bovell, John R., and J. P. d'Albuquerque. **Report on the sugar cane experiments for the season of 1917–1919.** Dept. Agric., Barbados, 1919.—Pages 4–19 deal with results of manurial experiments chiefly. The results of these, however, are said to be inconclusive owing to attacks on the cane of root grubs of *Diaprepes abbreviatus* Linn. and *Phytalus smithi* Arrow. In continuation of previous work with cane varieties, it was found (pp. 20–80) that B. H. 10 (12), Ba. 6032 and B. 6450 have given best results in the order named over a large number of experiments. Some newer seedlings such as B. S. F. 12 (27) and Ba. 11569 are also showing great promise.—*J. S. Dash.*

35. Brioux, C. H. **Les tourteaux et farines de graines de coton. [The oil-cake and meal of cotton seed.]** Ann. Sci. Agron. Francaise et Etrangére 35: 401–420. 1919.—The work of Withers, W. A. and F. E. Carruth of the North Carolina Agric. Exp. Sta. on the toxic principle gossypol in cotton seed is reviewed at length and attention is called to its importance in connection with the animal industry of France.—*A. B. Beaumont.*

36. Briscoe, Charles F., and H. H. Harned. **Bacteriological effects of green manure. Study No. 11.** Mississippi Agric. Exp. Sta. Bull. 185: 1–18. *8 fig.* 1919.—The object of this investigation was to determine the effect of micro-organisms in the fermenting of green manures and particularly the advantage of a light dressing of stable manure as compared with that of a bacterial culture, in the utilization of green manures for plant food. In carrying out the experiments two series of 3-gallon jars were used, one for the bacteriological, and the other for the vegetative tests. Sandy silt loam soil poor in nutrient elements was used. The green manures added were alfalfa, oats, and cow peas. Each pot to which bacterial emulsion was applied received an addition of about 25 billion germs. In every case an increase in the amount of green manure turned under gave an increase in oat crop yield. A maximum of 50 tons of the green manure was applied. A light dressing of a stable manure or the addition of a bacterial culture with a green manure gave a marked increase in the crop when 4 tons of the green manure were added. When 8 tons were added the effect was practically neutral; when 16 tons were added a depressing effect was noted from the addition of the germs, contained either in the manure or the bacterial culture.—The nitrogen content of the oat crop produced varied directly with amount of crop produced.—The cumulative effect of a green manure was marked.—*H. B. Brown.*

37. Brown, H. B. **Cotton experiments, 1918.** Mississippi Agric. Exp. Sta. Bull. 186: 1–31. *3 fig.* 1919.—This report gives results of cotton variety tests in five different sections of the State in which the performance of standard varieties and new strains developed by the Experiment Station were tested on different soil types. Cotton wilt and other studies made at the College Station are also reported. All the varieties grown showed some wilt infection but the wilt resistant varieties were damaged but slightly. Single stalk culture experiments gave 28 per cent better yields for early thinning. Fruiting studies showed that some varieties produced about 100 per cent more blossoms than others, and that some varieties retained more than 50 per cent of their forms while others retained less than 30 per cent. Germination counts and counts of number of seed in a given volume showed that the stand secured varied inversely with the size of the seed planted.—*H. B. Brown.*

38. Burgess, J. L. **Part I. The farmers' interest in good seed.** Bull. North Carolina Dept. Agric. 40^6: 5–8. 1919.—This is a popular article which indicates the value of mature seed in influencing yield and discusses the occurrence of noxious weed seeds among cereal and forage crop seeds.—*F. A. Wolf.*

39. Burkill, I. H. **Dioscorea alata, the greater yam, race no. 50.** Gardens' Bull. Straits Settlements 2: 158. 1919.

40. Burkill, I. H. **Dioscorea Kegeliana, Griseb., the "Yam Poule" of the West Indies.** Gardens' Bull. Straits Settlements, 2: 158. 1919.

41. Burkill, I. H. **Yields of the lesser yam [Dioscorea esculenta (Lour.) Burk.] and of some African yams.** Gardens' Bull. Straits Settlements 2: 159–165. 1919.

42. Burkill, I. H. **A progress report on the cultivation of the greater yam, Dioscorea alata—in the Botanic Gardens, Singapore.** Gardens' Bull. Straits Settlements 2: 129–135. 1919.

43. Burroughs, G. D. **Sweet potato storage houses in North Carolina.** Potato Mag. 2^4: 8–9. *2 fig.* 1919.

44. Calvino, Mario. **Una leguminosa gigantesca como yerba forrajera para Cuba. [A gigantic legume as a forage plant for Cuba.]** Estac. Exp. Agron. [Cuba] Bol. 43: 7–24. *7 fig.* 1919.—*Meibomia leiocarpa*, locally known as "mermelada de caballo," has been introduced from Brazil and grown successfully on all types of soils, particularly on those lacking in lime and phosphate, and in regions subject to drought. Yields were high and the plant, either green or dried as hay, was readily eaten by live stock. Preliminary tests indicated a possibility of a further use of the plant for the production of fiber.—*John A. Stevenson.*

45. Calvino, Mario. **Informe del director. [Report of the director.]** Informe An. Estac. Exp. Agron. [Cuba] 1917–1918: 1–439. *180 fig.* 1919.—A report of trials with various plants under Cuban conditions including corn, rice (local varieties), Indian millet, sorghum varieties, and buckwheat. Of legumes cowpeas, velvet beans, *Phaseolus helvolus* (a native bean), *Enterolobium cyclocarpum*, and *Phaseolus lunatus*, the latter being found unsuitable, were grown. Two Japanese varieties of soy bean (*Glycine hispida*) (*Soja max*) gave good results. Japanese cane, elephant grass (*Pennisetum purpureum*), molasses grass (*Melinis minutiflora*), Rhodes grass (*Chloris gayana*), *Paspalum dilatatum*, and the kudzu vine (*Pueraria thunbergiana*) all gave promise as forage crops under varying conditions. Alfalfa was not successful. A number of the common textile plants were grown experimentally. The sugar cane work of the station was continued along two lines, the production of seed lings and fertilizer tests. Tobacco selection studies were carried on as in the past. [See Bot. Absts. 3, Entry 2586; 4, Entry 970.]—*John A. Stevenson.*

46. Capitaine, L. **Le sésame en Orient. [Sesame in the Orient.]** Jour. Agric. Tropic. 19: 311–316. 1919.—In this paper, the first of a series on the subject, the author discusses in a rather popular manner the principal centers of production, seasonal adaptations of the crop in different regions, the preparation of the seed bed, and seeding.—*J. D. Luckett.*

47. Carle, E. **Premiers travaux sur la sélection des riz du Laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon Laboratory for the study of cereals.]** Bull. Agric. Inst. Sci. Saigon 1: 74–87. 1919.

48. Cauthen, E. F. **Comparison of peanut meal, cotton seed meal, velvet bean meal, ammonium sulphate, and nitrate of soda, as fertilizers for corn and cotton.** Alabama Agric. Exp. Sta. Bull. 208. *6 p.* 1919.

49. Chevalier, A. **Quelques legumineuses d'Extrême-Orient utiles à répandre. [Some legumes of Indo-China worthy of wider use.]** Bull. Agric. Inst. Sci. Saigon 1: 87–92. 1919.

50. Cockayne, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 18: 321–331. *Pl. 4.* 1919.—A further study of the montane tussock-grassland as to the relative palatability for sheep of the various pasture-

plants was made by a grazing test of sheep. Two hundred and eighty-one sheep were turned on 25 acres for 9 days and they seemed to prefer cocksfoot (*Dactylis glomerata*) first of all but if meadow grass (*Poa pratensis*) is present the cocksfoot is not touched until the meadow grass is cropped close. The plants taken after cocksfoot, in their apparent order of palatability were holy grass (*Hierochloe redolens*); willow (*Salix fragilis*); catsear (*Hypochaeris radicata*); Yorkshire fog (*Holcus lanatus*); seed heads of blue-tussock (*Poa colensoi*) and fescue-tossock (*Festuca novae-zelandiae*); tufted danthonia (*Danthonia semiannularis var.*) blue-tussock; tall blue-tussock (*Poa intermedia*); sweetbrier (*Rosa rubiginosa*); fescue-tussock (*Festuca novae-zelandiae*); and poa-tussock (*Poa caespitosa*). The author states that these observations regarding the plants eaten where sheep are grazing freely are notes merely and no definite conclusions are to be drawn. A table showing the opinions of various botanists regarding the palatability of the indigenous grasses of the montane and subalpine pastures is appended. [See next following Entry, 51.]—*I. S. Cook.*

51. Cockayne, L. **An economic investigation of the Montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 19: 120–138. *Fig. 1-4.* 1919.—This is the third article by the author on the Tussock Grassland of New Zealand in which he discusses the depletion of the grassland in the driest parts of Central Otaga. The average rainfall is from 10.89 inches to 14 inches and this condition along with an excess of rabbits has resulted in nearly barren areas over much of this region. The only kind of plant able to live under such conditions is scabweed (*Paoulia lutescens*) which is worthless as a forage plant. Owing to the unfavorable conditions for any desirable forage plant to survive, almost any plant would be welcomed which would prevent the land from becoming barren. [See next preceding Entry, 50.]—*I. S. Cook.*

52. Cowan, James. **Crop production in the northern sandhills.** Nebraska Agric. Exp. Sta. Bull. 171. *8 p.* 1919.—A brief résumé is given of some of the work of the Sub-Station which is located in the sand hills region of northwestern Nebraska. A number of conclusions applicable to the sand hills are drawn, though data are not presented. It is stated that native hay grown in the wet and dry valleys may be improved by early spring scattering of timothy and redtop seed in the meadow.—Native varieties of corn have not been surpassed in yield by any imported corn. The growing of wheat in the sand hills is confined to the hard lands. The Irish Cobbler is the most productive variety of potatoes. Mulching a subirrigated crop of potatoes with litter reduced the yield more than 20 per cent, while the mulching of potatoes on dry, light, upland soils increased the yield 27 per cent. Beans are regarded as an unreliable crop on light land and are not to be depended upon under such conditions of drouth as cause failure with such a crop as corn. On uplands, it is considered useless to plant more garden truck than can be well soaked twice a week by application of water when rain fails. Nearly every species of orchard tree advertised or recommended for hardiness and drouth resistance, has been tried out on the upland without success.—No species of deciduous trees has been found satisfactorily to survive the adverse conditions of the dry upland sandy soil. Poplars and cottonwoods thrive on subirrigated bottom land that is not too wet. Bull pines raised from seed collected in the vicinity of the sub-station have done better than any other species of tree. Even these gradually die off from year to year. Shallow rooting induced by shallow soil and surface moisture is regarded as one of the primary causes of fatality among the trees. All species of deciduous trees grown are attacked by borers.—*T. A. Kiesselbach.*

53. Crevost, C.; and C. Lemarié. **Plantes et produits filamenteux et textiles de l'Indochine [Fiber and textile producing plants of Indochina.]** Bull. Econ. Indochine 22: 365–401. *3 pl., 1 fig.* *Ibid.* 553–591. *2 pl., 9 fig.* 1919.—The first paper consists of a critical discussion of the four cultivated species of cotton (*Gossypium*) in Indo-China, with cultural and statistical data regarding them. The second paper contains the descriptions and detailed discussions of the economic products of *Enodendron anfractuosum* DC., *Bombax malabaricum* DC., *Cochlospermum gossypium* DC., *Wrightia annamensis* Eberh. & Dub., *Calotropis gigantea* R. Br., *C. procera* R. Br., *Typha*, and *Dicksonia Barometz* Link. These two papers are to be reprinted in volume 2 of the author's Catalogue of the products of Indo-China.—*E. D. Merrill.*

54. Cutting, M. C. **Peat soils of Minnesota and their cultivation.** Jour. Amer. Peat. Soc. 12: 190–194. 1919.—The state has 7,000,000 acres (nearly one-seventh of its total area) of peat land. Important factors in crop production on peat soil are drainage, climate and fertilization. Any one of these factors may be the limiting one. Three experimental tracts in different parts of the state were cultivated in 1918 by the State Experiment Station. On the basis of the results on the one in the northwest portion of the state it is suggested that rye, oats, barley, and a mixture of timothy and alsike clover be tried by the farmers of that region on either burned or unburned peat. On unburned peat the use of 12 tons of stable manure per acre or 200 to 400 pounds of acid phosphate is recommended. On burned peat the use of the fertilizer is unnecessary.—*G. B. Rigg.*

55. Dahl, A. L. **Growing hops in California.** Sci. Amer. Supplem. 87: 312–313. *4 fig.* 1919.

56. Dash, J. S. **Quelques conseils aux producteurs de cannes de la Guadeloupe. [Hints to the sugar-cane growers of Guadeloupe.]** Sta. Agron. Guadeloupe Bull. 1: 11–30. 1919.—See Bot. Absts. 3, Entry 2616.

57. Deem, J. W. **Marton Experimental Area.** New Zealand Jour. Agric. 19: 17–19. 1919. A summary of variety tests on wheat, oats, barley, and miscellaneous crops, and notes as to the feeding value of varieties of rape, kale, turnip, and kohl rabi.—*N. J. Giddings.*

58. De Graaf, W. C. **De cultuur van genees krachtige planten in Nederland. [Cultivation of medicinal plants in Holland.]** Pharm. Weekblad 56: 1101–1112. 1919.—See Bot. Absts. 3, Entry 2795.

59. Drake, J. A., J. C. Rundles, and Ralph D. Jennings. **Alfalfa on corn-belt farms.** U. S. Dept. Agric. Farmers Bull. 1021. *32 p., 16 fig.* 1919.

60. Duggar, J. F., and H. B. Tisdale. **Velvet bean seeds: results of germination experiments.** Alabama Agric. Exp. Sta. Press Bull. 98. *4 p.* 1919.

61. Dunlap, M. P. **The seed growing industry in Denmark.** Seed World 6³: 18–19. 1919.

62. Fairchild, David. **The palate of civilized man and its influence on agriculture.** Sci. Amer. Supplem. 87: 68–71. *8 fig.* 1919.

63. Farmer, George. **Annual Report of the Economic Plants Division for the year ending 31st March, 1917.** Dept. Agric. British East Africa Ann. Rept. 1916–1917: 29–36. 1918.

64. Feilitzen, H. von. **Cultural experiments on moor lands.** Jour. Amer. Peat. Soc. 12: 216-217. 1919.—An increased yield of hay in a 5-year test was secured by mixing sand with the surface layer of an imperfectly decomposed peat soil. A surface covering of sand also gave good results with various crops on shallow bog soils. Phosphorus carriers were beneficial. Nitrogen carriers were not beneficial on account of the high nitrogen content of the soils.—*G. B. Rigg.*

65. Fortun, Gonzalez M. **Informe de los departamentos de agricultura y botanica. [Report of the departments of agriculture and botany.]** Informe Estac. Exp. Agron. [Cuba] 1917–1918: 441–448. 1919.—Report of work for the year.—*John A. Stevenson.*

66. Fron and Rigotard. **Contribution a l'étude de la flore fourragere spontanée au Maroc et particulièrement du Lotus arenarius (Brotero). [Native forage plants of Morocco, especially Lotus arenarius.]** Compt. Rend. Acad. Agric. France 5: 704–709. 1919.—A discussion of the properties of *Lotus arenarius* as a fodder plant, its botanical characteristics, its distribution, and its possible value under cultivation.—*E. A. Bessey.*

67. Fruwirth, C. **Landwirtschaftliche wichtige Hulsenfruchte. [Agriculturally important legume-seed crops.]** Landw. Hefte 30 and 31: 1-76. *Pl. 1, fig. 1-11.* 1919.—The first part of this important treatise dealing with peas, vetches, field bean, lupines and lentil was published in No. 29 of the same journal in 1918. The second part considers soy bean, kidney bean, scarlet runner, chick pea, ervil, *Vicia monantha*, and grass pea (*Lathyrus sativus* L.), besides various legumes whose seeds are imported into central Europe, including Lima bean, adsuki bean, mung, urd, moth, jack bean, sword bean, cowpea, asparagus bean, catjang, bonavist, gram (*Dolichos biflorus* L.), velvet beans, and pigeon pea. Extensive agronomic and botanical data are given concerning each crop, and also information concerning the uses and manufactured products of each. The work brings up to date previous similar publications of the author.—*C. V. Piper.*

68. Gaylord, F. C. **Making the Indiana potato crop profitable.** Trans. Indiana Hortic. Soc. 1918: 25-28. 1919.—Cultural methods and care of the potato crop are discussed with notes on varieties for Indiana planting.—*F. P. Cullinan.*

69. Gerum, J. **Über den Starkegehalt von Haferflocken. [The starch content of oat flakes.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 157-159. 1919.

70. Gerum, J. **Über den Ausmahlungsgrad der Mehle. [Degree of grinding of flours.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 145-157. 1919.—The starch content in the air dried material is taken as an index of the degree to which meal has been ground. Report on rye and wheat meals for the last four years.—*H. G. Barbour.*

71. Girola, Carlos D. **Maices argentinos y aclimatados; Variedades de Maíz cultivadas en Argentina. [Maize varieties cultivated in Argentina.]** *160 p., 35 pl.* Buenos Aires, 1919.—Classification and descriptions of the principal varieties and five botanical species of the genus *Zea* as given by Bonafous. Thirty-seven named varieties cultivated in Argentina are described and illustrated with plates—many of them colored, showing ears and kernels natural size. They are classified under six subspecies of *Zea mays*. Two diseases, carbon del maiz, *Ustilago maydis*, and palvillo del maiz, *Puccinia maydis*, are described and illustrated. —*L. H. Dewey.*

72. Graber, L. F. **Grimm alfalfa and its origin.** Seed World 5^1: 21. 1919.

73. Hartwell, Burt L. **The manurial value of a modification of orthoclase-bearing rock where only potassium was deficient.** Jour. Amer. Soc. Agron. 2: 326-329. 1919.—See Bot. Absts. 4, Entry 1661.

74. Hayes, H. K., and R. J. Garber. **Synthetic production of high-protein corn in relation to breeding.** Jour. Amer. Soc. Agron. 2: 309-318. 1919.—See Bot. Absts. 4, Entry 599.

75. Heritage, J. P. **Some industrial uses of the potato.** Sci. Amer. 121: 388, 398. 1919.

76. Hernandez, Nemesio M. **The effect of natural fertilizers on the production of tobacco.** Philippine Agric. 7: 308-313. 1919.

77. Hertel, H. **Landbruget i 1918 [Agriculture in 1918.]** Tidsskr. Landokonomi (Kjöbenhavn) 1: 1-43. 1919.—The article contains a general review of agricultural conditions in Denmark during 1918; particularly as affected by the war. During this period the importation of raw material of all kinds was almost entirely stopped and exports were reduced to practically nothing, while the local distribution of products was seriously hampered. The percentage of profit on various agricultural products was fixed by law. The war prices of wool, butter, fertilizers, etc., are discussed. The exportation of green vegetables, hops, and many other agricultural products was forbidden. The various war-measures as related to agriculture are discussed, indicating that the farmers of Denmark were seriously affected by war conditions. The harvest for the year 1918 was below normal. The importation of clover

seed from Russia almost ceased. During 1917–18, Danish cattle suffered seriously from lack of food, due in large part to the exceedingly dry summers during both years, and the ceasing of importation of oil cakes and oil meal from the United States.—*Albert A. Hansen.*

78. Holland, J. H. **Food and fodder plants.** Kew Bull. Misc. Inf. [London] 1919: 1–84. 1919. This is an account of the history, distribution, popular botanical features and economic products of the chief food and fodder plants of the world. Both scientific and common names of the plants are given.—*E. M. Wilcox.*

79. Holmes, Smith. E. **Flax cultivation.** South African Jour. Indust. 2: 1022–1033. *2 pl.* 1919.

80. Holmes Smith, E. **Fibre plant investigations.** South African Jour. Indust. 2: 969–983. 1919.

81. Hunter, Byron. **Dry farming for better wheat yields. The Columbia and Snake River basins.** U. S. Dept. Agric. Farmers Bull. 1047. *14 fig.* 1919.

82. Iverson, Karsten. **Lokale Forsog med Kunstgodning til Korn og Rodfrugt. Vdforte paa Fyn i darene 1901–1915. [Local experiments with fertilizers for cereals and root crops. Performed in Fyn in the years 1901–1915.]** Tidsskr. Landburg. Planteavl 26: 193–297. 1919. —See Bot. Absts. 4, Entry 1664.

83. Iverson, Karsten. **Dyrkningsforsög med forskellige sorter af toradet byg, 1913–1916. [Experiments with different varieties of two-rowed barley, 1913–1916.]** Tidsskr. Landbrug. Planteavl 26: 1–37. 1919.—Previous experiments have demonstrated that the Archer variety of barley yielded the highest average quantity of grain. Archer barley produces abundant foliage, ripens late and there is practically no difference in yield and botanical distinctions between the various strains experimented with; namely Svalöf's Princess and the three Prentice varieties, Lyngby, Tystofte and Abed. All are similar to Irish Archer. The results of a series of experiments are described in which the Tystofte strain is compared with Abed Bender, Svalöf Golden and Svalöf Hannchen, which are early ripening with short, stiff straw. Experimental comparisons were also made with Tystofte No. 40, Abed, Rex and Abed No. 570, all new strains In general, the results indicate that the difference between the latest and earliest strains depends mainly on the factor of upright growth or crop lodging. Abed Bender yielded best results in lodged crops, while Tystofte Prentice yielded best in upright crops. Seven sets of experiments were used, located in seven different situations under varying soil conditions and each consisting of eight plots. Data were collected for four years, 1913–1916.—*Albert A. Hansen.*

84. Jennings, A. C. **The economic aspect of irrigation.** Rhodesian Agric. Jour. 16: 429–432. 1919.

85. Johnson, T., and C. Boyle. **Observations on the industrial and nutritive value of the potato in Ireland.** Jour. Dept. Agric. Ireland 19: 416–429. *Fig. 1–3.* 1919.—Discusses variation in starch content as related to differences in variety, soil, fertilizer, rainfall and climate.—*Donald Folsom.*

86. Jones, C. Bryner. **The breaking up of permanent grass in 1918.** Jour. Roy. Agric. Soc. England 79: 24–44. 1918.—See Bot. Absts. 4, Entry 1665.

87. Killer, J. **Über die Umzüchtung reiner Linien von Winterweizen in Sommerweizen. [Concerning the changing over of pure lines of winter wheat into spring wheat.]** Jour. Landw. 67: 59–62. 1919.—Experiments at the Experiment Station at Colmar in Alsace with a large number of pure lines of winter wheats showed that those belonging to a certain type may serve equally well as spring or winter wheats; those of another type, if sown early in the spring, will form more or fewer heads; while those of a third type do not even form culms

when spring sown. Examples of varieties of the first type are cited. All changing over of winter wheat into spring wheat is not considered as due to the acquisition and inheritance of new characters, but rather as the expression of inherent possibilities already present in certain strains or varieties. The ability thus to change over may be increased and fixed by selection.—*C. E. Leighty.*

88. Lanxon, W. R., Arthur J. Ogaard, and U. J. Downey. **Report of the Hettinger Sub-station for the years 1913 to 1918 inclusive.** North Dakota Agric. Exp. Sta. Bull. 130. *56 p. Fig. 1–5.* 1919.—(Authors not jointly responsible.)—Crop yields are given for various crop rotations. Yields are presented of different varieties of cereals and of one variety under various methods of treatment. Notes and some yields are given for flax and for potatoes. Yields are given for certain forage crops, especially for smooth brome-grass (*Bromus inermis*) and the foxtail millets (*Chaetochloa italica*). Notes and yields are given for field corn (*Zea mays*). Weather data relative to crop production are presented.—*L. R. Waldron.*

89. Leighty, Clyde E. **The place of rye in American agriculture.** U. S. Dept. Agric. Yearbook 1918: 169–185. 1919.—Rye is receiving more attention now by farmers, agricultural colleges, and experiment stations. Statistics are given showing the increased production in the United States. Rye and wheat as foodstuffs are compared quite favorably to rye. The reasons given for increased rye production are: the present unusual food situation, hardier nature, adaptability to poor soil, distributes labor in farm management, immunity to Hessian fly, excellence as a cover crop, traps nitrates through the winter, excellence for green manure, value as a nurse crop, quality as a soiling and silage crop, and finally utility as pasture crop. The grain is a good basis for flour mixtures, but is not a very good animal feed. The straw has high value as packing material, but not much value as feed. Article closes with a plea for overcoming the prejudice against rye and increasing its production and use in the United States.—*C. J. Shirk.*

90. Leighty, Clyde E. **Buckwheat.** U. S. Dept. Agric. Farmers Bull. 1062. *24 p. 6 fig.* 1919.

91. Little, A. D. **The paper making qualities of Hawaiian bagasse.** Exp. Sta. Hawaiian Sugar Planters' Assoc. Agric. Chem. Ser. Bull. 46: 5–51. 1919.—A report is given of a technical investigation regarding the utilization of Hawaiian sugar cane bagasse for paper making under the following heads: Discussion of previous attempts to utilize, technique involved, commercial aspects, estimates of investment and production costs, tabulation of experimental data, and list of patents involved.—*J. M. Westgate.*

92. MacDonald, A. C. **Report of the Director of Agriculture.** Dept. Agric. British East Africa Ann. Rept. 1916–1917: 1–20. 1918.

93. Macpherson, A. **Potato variety test.** New Zealand Jour. Agric. 19: 40. 1919. A brief report on yields from forty-nine varieties.—*J. N. Giddings.*

94. M[arcarelli], B. **Il semenzaio nel trapianto del riso. [The seed-bed and the transplanting of rice.]** Gior. Risicoltura 9: 40–47. 1919.—A popular article. The author advocates the transplanting of young rice plants (*Oryza sativa*) grown in a seed-bed to the field and gives instructions as to the preparation, fertilizing, seeding and care of the seed-bed. —*R. Kent Beattie and Francesco Ventresca.*

95. Marcarelli, B. **Il riso "Giallo Precoce Ardizzone." [The rice "Giallo Precoce Ardizzone."]** Gior. Risicoltura 9: 20–23. *1 pl.* 1919.—This new variety of rice (*Oryza sativa*) selected by Pietro Ardizzone from the variety *Chinese Originario* in 1915 is very early but possesses the good qualities of the later varieties. The plant is noticeably paler green in color than other common Italian varieties. It yields up to 50–55 quintals per hectare (75 to 82 bushels per acre). Its culture is spreading rapidly in Italy.—*R. Kent Beattie and Francesco Ventresca.*

96. Marchand, B. de C., and B. J. Smit. **The composition of some feeding stuffs.** Union of South Africa, Dept. Agric. Bull., Gen. Ser. 5: 1–11. 1919.

97. Mathieu, E. **Acclimatisation trials of lima beans (Phaseolus lunatus).** Gardens' Bull. Straits Settlements 2: 121–129. 1919.—As a result of trials with eight varieties of American lima beans through three generations, it was concluded that the beans had not suffered degeneration through change of climate and had become definitely acclimatized.—*S. F. Trelease.*

98. McCall, J. Stewart J. **Nyasaland Protectorate. Ann. Rept. Dept. Agric. for year ending 31st March, 1918.** *26 p.* 1919.

99. McClellan, F. C. **Zanzibar protectorate. Ann. Rept. Agric. Dept. for year 1917.** *15 p.* 1919.

100. McHargue, J. S. **The effect of manganese on the growth of wheat: a source of manganese for agricultural purposes.** Jour. Indust. Eng. Chem. 11: 332–335. 1919.—See Bot. Absts. 4, Entry 1610.

101. McKee, Roland. **Australian saltbush.** U. S. Dept. Agric. Bull. 617. *11 p. Fig. 1–4.* 1919.—This forage plant, *Atriplex semibaccata*, was introduced into this country about 25 years ago and distributed for planting throughout the arid and semi-arid regions. Successful production has occurred only in certain regions of southern California and in Arizona. The plant is semiwoody, perennial, procumbent and forms a dense mass. It is thriving best in regions having a minimum temperature of 19°F, mean annual rainfall of 9 to 16 inches and soils relatively high in alkali. The plant is comparatively drought resistant, spreads aggressively and is high in content of common salt. For the last reason it is not highly palatable but a valuable range feed for sheep, goats, cattle and horses when other feed is scarce. For maximum value, it should be supplemented with other forage. Its greatest value is to supply a late summer range forage and in some cases a soiling crop. It has little value as hay.—*E. V. Hardenburg.*

102. McLean, Forman T. **The importance of climatology to tropical agriculture.** Philippine Agric. 7: 191–194. 1919.—See Bot. Absts. 4, Entry 379.

103. McTaggart, A. **Limiting factors in farming.** New Zealand Jour. Agric. 18: 332–338. 1919.—The subject is treated under subheads of labor, machinery and power; soil-moisture; weather conditions; knowledge and its application; business training; soil treatment; weeds; pests and diseases; coöperation; and migratory farming. The difficulties encountered and possible methods of overcoming them are dealt with briefly. This entire problem is one which should receive careful investigation from the best men in the various fields.—*N. J. Giddings.*

104. Mercier, C. A. **The electrification of seeds.** Sci. Amer. 120: 142–143. *6 fig.* 1919.—The process is very simple in principle. A salt solution that will act as a conductor is placed in a tank, the seeds to be treated are steeped in it, and a weak current of electricity passed through it by means of electrodes of large surface, attached to two opposite end walls of the tank. The seed is then taken out and dried. The kind of salt used, the strength of the solution, the length of treatment, the strength of the current and the speed and amount of drying is varied according to the kind of seed, soil factors and other conditions Detailed methods have been worked out for wheat, oats and barley, but root crops, maize, rice, cabbage and other plants grown for seed are known to be benefited. Advantages of the process are (1) an average increase of yield of 25 to 30 per cent; (2) increased quality of crop as indicated by the weight per bushel, which in the cereals mean better milling quality, less offal and more flour per bushel; (3) an increase in the straw (electrified seed produces larger crops of straw and the straws are longer and stronger than unelectrified), and (4) the reduction in the growing plants of smut, bunt, rust and other fungus diseases. Disadvantages are (1)

unsatisfactory results if process is not properly carried out, (2) only temporary effect upon the seed (treated seeds will retain their enhanced efficacy only for about a month after electrification, if kept in a dry place) and (3) the advantages accruing from the process are not uniform.—*Chas. H. Otis.*

105. Migault, L.-D. **Quelques notes sur une mauvaise herbe. [Some notes on a bad weed.]** Naturalist Canadien 45: 181–183. June, 1919.—A semi-popular description of the "*Reveille-Matin*" (*Euphorbia helioscopia*) in parts of the Province of Quebec.—*A. H. MacKay.*

106. Moaloot, P. H. **Cultivating Ambrette shrubs in Grenada, British West Indies.** Amer. Druggist and Pharm. Rec. 67: 301–303. *4 fig.* 1919.—An account of the cultivation of *Hibiscus Abelmoschus* of the *Malvaceae.* The seed has an odor like musk and is used in perfumery being marketed as Musk Seed, Ambrette Seed, or Grains d'Ambrette. The plant has upwards of 20 common names, one of them being Marshmallow, also a synonym of Althaea, U. S. P. The best crop is obtained when the seed is sown broadcast which may be any time from February to June, dependng upon weather conditions. A botanical description is given and the methods used in cultivating, reaping, preparing the essential oil and marketing are given in detail.—*O. A. Farwell.*

107. Mogg, Albert Oliver Dean. **Some preliminary observations on unseasonable veld-burning and its possible relation to some stock diseases.** South African Jour. Sci. 15: 653. 1919.

108. Mondino, Alfonsino. **Richerche anatomiche e morphologiche sulla var. "tuberosa" Asch. dell "Arrhenatherum elatius" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological studies on var. tuberosa Asch. of Arrhenatherum elatius. M. K.** [(L.) Beauv., not M. & K.—*C. V. P.*] **recently found in Piedmont.]** Atti R. Accad. Sci. Torino 54: 782–794. 1919.—See Bot. Absts. 4, Entry 988.

109 Mosséri Victor M. **Note sur les dépôts nilotiques des Gazayer et Saouahel d'Égypte. [Note on the deposits of the Nile of the "Gazayer" and "Saouahel."]** Bull. Union des Agric. Egypt 17: 49–78. 1919.—A scientific study of the alluvial deposits on the overflowed lands along the banks (Gazayer) and on the higher benches (Saouahel) of the river Nile confirms the correctness of the farming system of the fellahs (native farmers) which has been practised from remote antiquity. It is essentially a system of dry land farming with a single annual supply of water. The deposited soil is sometimes sand or a sandy clay but is more often a black clay. The author discusses the movements of the salts of calcium and other bases in this clay soil and the relation of these movements to the physical properties of the soil.—*R. Kent Beattie.*

110. Munn, M. T. **Seed tests made at the Station during 1918.** New York Agric. Exp' Sta. [Geneva] Bull. 462:135–156. 1919.—Purity tests were made of 179 official and 287 unofficial samples of agricultural seeds offered for sale in the state of New York; also, 396 samples were tested for viability. Comments are made on the results of the tests, the need of a stricter seed law, and the importance of testing the viability of cabbage seed. Warning is given against the purchase of the cheap, impure seed mixtures offered by mail order seed houses. Directions are given for the home testing of seed corn and the detection of injury to seed corn by freezing.—*F. C. Stewart.*

111. Murias, J. Suarez. **Informe del departamento de semillas. [Report of the seed department.]** Informe An. Estac. Exp. Agron. [Cuba] 1917–1918: 465–477. 1919.—Report of germination, purity, and other seed testing for the year.—*John A. Stevenson.*

112. Murray, H. E. **The sugar industry of British Guiana.** Jour. Bd. Agric. British Guiana 12: 83–89. 1919.—Gives brief history of industry from 1877 to date. Recommends up to date factories, mechanical tillage and an increased number of small cane farmers. Gives details for alloting land to cane farmers and methods which they should follow in working the land.—*J. B. Rorer.*

113. Neidig, Ray E., and Lulu E. Vance. **Sunflower silage.** Jour. Agric-Res. 18: 325–327. 1919.—The composition of sunflower silage compares very closely with that of maize silage. Practical feeding tests indicate that sunflower silage is equal to maize silage for many purposes. Sunflower (*Helianthus*) may prove a good silage substitute for maize where the latter can not be grown.—*D. Reddick.*

114. Nilsson, George. **Redogorelse för försök med havresorter på Domnarvet 1905–1917. [Account of oat variety tests at Domnarvet (Sweden) 1905–1917.]** Sver. Utsädesf. Tidskr. 29: 37–44. 1919.—Fourteen years tests of 11 varieties of oats with records on yield of grain and straw, time of maturity, hektoliter weight, weight per thousand grams, per cent of kernel, and proportion of double kernels. Comparison with data from Ultuna indicates that the same varieties produce a better quality of grain in the more northern region. Recommends Victory and Goldrain for medium and Bjorn and Svalof's Dalahavre for early varieties.—*E. G. Anderson.*

115. Oakley, R. A. **Critical studies in seed production.** Seed World 6[1]: 41–42. 1919.—Author states that there is great need of critical investigation to stabilize commercial seed production. Critical experimentation will clear up some vital seed production problems and certain fallacies relative to acclimatization and deterioration of planting stocks.—*M. T. Munn.*

116. Peralta y Leaño, Fernando de. **A study of the relation of climatic conditions to the vegetative growth and seed production of rice.** Philippine Agric. 7: 159–179. *Pl. 1–4.* 1919.—Plots of lowland rice were started every four weeks during a period of one year, and observations on climatic conditions and on growth and seed production were made regularly throughout the period. The author reports that the yield of grain was highest in cultures that were sown in April, May, and June, respectively, and then decreased rapidly to the culture sown in October, after which it increased again. The maximum vegetative growth and grain yields were obtained during the period of highest evaporation rates (measured by Livingston atmometers), and the minimum were obtained during the season of low evaporation rates. A discussion is given of the relation of the development of the plants to temperature, evaporation, insolation, and rainfall.—*S. F. Trelease.*

117. Pfeiffer, Th., W. Simmermacher, and A. Rippel (in collaboration with Frl. H. Friske, and Frl. Ch. Pfotenhauer). **Der Gehalt der Haferpflanzen an Stickstoff. Phosphorsäure und kali unter verschiedenen Bedingungen und seine Beziehungen zu der durch eine Nährstoffzufuhr bedingten Ertragserhöhung. [The nitrogen, phosphoric acid and potassium content of the oat plant under different conditions and their relations to the increased yield resulting from addition of nutrients.]** Jour. Landw. 67: 1–57. *6 fig., 15 tables.* 1919.—See Bot. Absts. 4, Entry 1425.

118. Robbins, W. W. **Research and seed testing.** Seed World 5[10]: 28. 1919.—The author discusses the question under two heads, namely; (1) organization of the individual laboratories for research work, and (2), organization and coördination of the research activities of North American seed laboratories. The conclusion reached is that investigation and research should constitute a definite part of the program of seed laboratories.—*M. T. Munn.*

119. Roig, Juan T., and Gonzalo M. Fortun. **Dos malvas textiles Cubanas. [Two Cuban malvas as fiber producers.]** Estac. Exp. Agron. [Cuba] Bol. 41: 1–47. *8 fig.* 1919.—A study was made of two very common indigenous species of the family *Malvaceae* of Cuba as to their possible value as fiber producing plants. *Urena lobata* and *U. sinuata* are described botanically, their distribution in Cuba recorded, and comparison made with other related Cuban plants which yield fiber. Manner of cultivation, results of fertilizer and cultural experiments, methods of harvesting and preparing the fiber, as well as obtained yields are given.—*John A. Stevenson.*

120. Rolet, Antonin. **Botanicals in central Europe.** Pharm. Era 52:283. 1919. (Translated from *Farmacia*).—The author discusses the cultivation of medicinal plants in Central Europe and their exportation to France and other countries before the war; he gives credit to Charles Irk, of the Bureau of Medicinal Plants of Kolozsyar Tschiret, as the initiator of the rational, systematic, cultivation of medicinal plants in central Europe.—*Oliver Atkins Farwell.*

121. Rupp, G. **Tabak-Ersatzmittel. [Tobacco substitutes.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37:370–377. 1919.—German tobacco substitutes include hops and beech, chickory, linden, maple, plane, and chestnut leaves; also clover and rose leaves, violet root powder, woodruff, plantain leaves, althaea, coltsfoot, baldrian root, nettle, curled mint, lemon rind, lavender and thyme; also pear, apple, walnut, hazelnut and artichoke leaves.—Preparations containing 20 per cent hops are said to produce headache and dizziness. Ethereal oils in tobacco substitutes considered harmless because burned. Content of pyridine, ammonia, CO, etc., in smoke of these products still undetermined.—Sample product: 30 per cent tobacco, 30 per cent cherry leaves, 30 per cent beech leaves, and 10 per cent woodruff, or 30 per cent tobacco ribs, 10 per cent cherry leaves, 30 per cent chestnut leaves, and 20 per cent beech leaves.—*H. G. Barbour.*

122. Russell, G. A. **The effect of fertilizers on the composition of hops.** Jour. Indust. Eng. Chem. 11:218–224. 1919.—No constant definite effect of fertilizers on the amount of soft resins, hard resins, total resins, soluble ash, insoluble ash, and total ash present in the hops is found.—*H. Schmitz.*

123. Scarlett, W. G. **Seed laws and seed testing from the viewpoint of the seedsmen.** Seed World 5³: 242–243. 1919.

124. Schribeaux. **Sur l'herbe du Soudan. [Sudan grass.]** Compt. Rend. Acad. Agric. France 5:460–464. 1919.—Discussion of the culture of this grass (*Sorghum exiguum*) in southern France, with report of experiments made by M. Libes as to the yield, etc. It is considered a very promising new forage crop for southern France.—*E. A. Bessey.*

125. Scofield, C. S. **Cotton rootrot spots.** Jour. Agric. Res. 18:305–310. *7 fig.* 1919. —See Bot. Absts. 4, Entry 1350.

126. Skerrett, R. S. **For seed or for fiber? How a faulty system has led the American flax-grower to waste millions of dollars.** Sci. Amer. 121:30–31. *5 fig.* 1919.—Discusses the need of conservation in our present flaxseed cultivation so that flax will be raised not only to supply seed for the manufacture of linseed oil and linseed cake, but also for the straw, linen yarns, short length fibers and cortex which can be woven into textiles and manufactured into numerous other products.—*Chas. H. Otis.*

127. Snell, John. **Potatoes: local immune variety trials.** Jour. Bd. Agric. [London] Supplem. 18:103–114. 1919.—See Bot. Absts. 4, Entry 1358.

128. Stevens, O. A. **Weed seeds in analyses.** Seed World 5³: 243. 1919.—A discussion is given of the variations which occur in the number of foreign seeds reported per unit weight of sample analyzed. Data are presented to show the range of variation which may be expected.—*M. T. Munn.*

129. Stone, A. L. **Testing of newly harvested field seed is difficult problem.** Seed World 5¹⁰: 37. 1919.—Author considers the problem of the seed analyst to shorten the period required to obtain satisfactory germination tests of newly harvested seeds of grains and grasses. While a prolongation of the duration of the germination test gave a satisfactory test, the period between the time of thrashing and the time the grain is to be used for seeding or placed upon the market with germination data is so short as to make such a procedure a practical impossibility. From investigational work with wheat it appears that the matura-

tion process proceeds as rapidly in dry storage as in the presence of external or supplied moisture or vice versa. The problem becomes one of hastening the process of maturation, or determining from a large number of tests a satisfactory rate of increase, which may be used as a basis for computing germination tests of certain newly harvested seeds when time will not permit the securing of tests, in the usual way, upon fully matured seeds.—*M. T. Munn.*

130. Stuart, William. **Production of late or main-crop potatoes.** U. S. Dept. Agric. Farmers Bull. 1064. *39 p., 21 fig.* 1919.

131. Stuart, William. **Good seed potatoes and how to produce them.** Potato Mag. 2^3: 12–13; 2^4: 14–15. *1 fig.* 1919.

132. Swanson, C. O., L. E. Call, and S. C. Salmon. **Losses of organic matter in making brown and black alfalfa.** Jour. Agric. Res. 18: 299–304. 1919.—The authors' summary is as follows: "Partially wilted alfalfa (*Medicago sativa*) stacked without curing undergoes fermentative changes which result in the loss of about two-fifths of the organic matter. This loss apparently increases with the length of time in the stack and with the degree of fermentative changes that occur. Alfalfa which has become black as a result of fermentation is very inferior as a feed for steers in comparison with both brown alfalfa hay and hay of good color and quality."—*D. Reddick.*

133. T[archetti], A. **Puliamo i risoni e selezioniamo quelli da seme. [The cleaning of the rice-crop and the selection of seed-rice.]** Gior. Risicoltura 9: 2–7. 1919.—This popular description of the methods recommended is made especially necessary because of the excessive amount of yellow rice, immature rice, and dead grains in the 1918 crop of rice (*Oryza sativa*) in Italy.—*R. Kent Beattie and Francesco Ventresca.*

134. Taylor, H. W. **Tobacco culture. Field operations.** Rhodesia Agric. Jour. **16:** 401–408. *Pl. 1–3.* 1919.

135. Tuero, Fernando Lopez. **Anil. [Indigo.]** Informacion Agric. [Madrid] 9: 169–170, 195–197, 224–228. 1919.—An account of indigo culture including botanical description of the species involved (*Indigofera* spp.), history of the culture, soils, seeding, cultivation, harvesting, and preparation of the final product.—*John A. Stevenson.*

136. Turnbull, Gervaise. **Increased production of grass.** Jour. Bd. Agric. Great Britain 26: 607–621. 1919.

137. Ulibarri, Ricardo B. **La papa. [The potato.]** Bol. Camara Agric. Nacion. Leon Mexico] 6: 262–288. 1919.—A compiled account of the history, structure, varieties, cultivation, insect pests, and fungus diseases of the potato (*Solanum tuberosum*).—*John A. Stevenson.*

138. Varela, E. **El frijol dolico. [The Dolichos beans.]** Revista Agric. [Mexico] 4: 18–20. *2 fig.* 1919.—*Dolichos unguiculata, D. sesquipedalis,* and *D. lablab* described briefly. —*John A. Stevenson.*

139. Waldron, Ralph Augustus. **The peanut (Arachis hypogaea) its history, histology, physiology and utility.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 301–338. *Pl. 79–80.* 1919. —The author found root hairs on the plant, although reported absent by two previous workers. Their growth is stimulated by a high temperature and humidity, the tip hairs appearing in very young plants when growing rapidly and exposed to moist air. The hypocotyl, through the tendency to store sugar, enlarges and becomes tuberous unless growth conditions are ideal. The results of a study of stem structure and leaf structure follow in sequence. The author shows that the fruit stalks, or gynophores, are geotropic. The epidermal cells of the carpellary tips are remarkably granular thus suggesting a possible perceptive relation of the granules. The epidermis of the hypogeal parts becomes elongated to

form absorptive hairs. The development of the young fruit is described. Attempts to produce peanuts in the air yielded no definite results. Where the young fruits were allowed first to come in contact with the soil and were then exposed to the air, they continued to develop to a certain extent and turned green. A detailed bibliography is given. [See also Bot. Absts. 1, Entry 999.]—*John W. Harshberger.*

140. Werner, H. O. **Seed potato production in Western Nebraska.** Potato Mag. 2: 10–11. *4 fig.* 1919.

141. Werner, H. O. **Potato experiments, 1917 and 1918.** North Dakota Agric. Exp. Sta. Bull. 129. *22 p. Fig. 1–2.* 1919.—Varieties Early Ohio, Irish Cobbler, Rural New Yorker, Green Mountain and Burbank were grown at 7 points in North Dakota for 1917–1918 and comparative yields secured. Yield data on 5 varieties were obtained at Fargo, North Dakota, with and without manure. Using mainly Early Ohio, yield data were obtained at Fargo when treatment dealt with position of buds on tuber, number of buds per piece of seed, method of cutting tubers, rapidity of sprout emergence and stalks per plant, date of harvesting, planting distance, treatment of seed tubers, spraying, hilling and cultivating. Weather data are given. No summary.—*L. R. Waldron.*

142. Wery, G. [Rev. of: Azze. **Les périodes critiques de la végétation et les phénomènes météorologiques. (Critical periods of vegetation in relation to meteorological phenomena.)** Paper read before Acad. Agric.] Compt. Rend. Acad. Agric. France 5: 828–834. 1919.—This is a review of a paper presented by Azze before the Academie Agricole. It discusses what is meant by the term 'critical period,' these periods being occasions that are harmful or entirely destructive to the crop under study because of some meteorological condition such as excess or lack of rainfall, too great heat, or frost, at times which may have a serious influence on the development of the crop. Thus a lack of rainfall at the time that wheat is beginning to head, though sufficient before or after that date, may seriously compromise the size of the crop. Description is given of the preparation of maps, which show for each individual crop, the critical periods for production in the different parts of the country.—*E. A. Bessey.*

143. Westgate, J. M., F. G. Krauss, C. A. Sahr, and R. A. Goff. **[Report of work in agronomy.]** Hawaii Agric. Exp. Sta. Rept. 1918: 11, 12, 26–35, 45–55. *Pl. 6, 11.* 1919.—Investigations have shown that a variety of corn introduced from Guam is very resistant to the attacks of the corn leaf hopper (*Peregrinus maidis*), much higher yields being obtained than from any of the strains introduced from the mainland. Plantings of edible canna (*Canna edulis*) yielded at the rate of over 40 tons of tubers per acre. The tubers constitute a valuable source of starch and also serve as pig feed in normal times and as an emergency human ration when necessary. Pigeon peas (*Cajanus indicus*) have given exceptional results as a drought-resistant leguminous crop, valuable both for seed and forage. A new strain of red kidney bean has been developed under the name New Era Copper Kidney, which has yielded 40 per cent more under field conditions than any other of the numerous varieties under test. The Hamakua Hybrid potato in the blight resistance tests outyielded any of the imported or other local varieties at the Glenwood substation.—*J. M. Westgate.*

144. Wheeler, W. A. **Seed trade with European countries.** Seed World 6^1: 32–36. 1919.

145. Wheeler, W. A. **Some aspects of seed control.** Seed World 6^1: 30–31. 1919.—A discussion is given of the objects of seed legislation, and the faults of the disclaimer clause. Uniform stock records should be kept of all lots of seed handled showing source, origin, description and quality of the stock.—*M. T. Munn.*

146. Wheeler, W. A., and G. C. Edler. **Some effects of war upon the seed industry of the United States.** U. S. Dept. Agric. Yearbook 1918: 195–215. 1919.—See Bot. Absts. 4, Entry 975.

147. Willaman, J. J., R. M. West, D. O. Spriestersbach, and G. E. Holm. Notes on the composition of the sorghum plant. Jour. Agric. Res. 18: 1-33. 1919.—See Bot. Absts. 4, Entry 1482.

148. Wright, C. Harold. The alluvial soils of Fiji. Dept. Agric. Fiji Bull. 11. *12 p.* 1919.—See Bot. Absts. 4, Entry 1689.

149. Zook, L. L. Spring grains in western Nebraska. Nebraska Agric. Exp. Sta. Bull. 172. *16 p., 4 fig.* 1919.—The experiments reported in this bulletin were conducted at the North Platte Experimental Sub-Station in central Nebraska, and cover a ten year period, 1909 to 1918 inclusive. Four spring crops—wheat, oats, barley and emmer were grown at four successive planting dates with 12 days intervals. Results are tabulated for each crop during each year and the following conclusions are drawn: Early seedings produced the best yields every year except two. The average yields of all crops were materially better from early than from late seedings. There was less difference between early and late seedings of barley and oats than of wheat and emmer.—Barley outyielded any other crop. On account of the length of season in which barley can be successfully seeded, its high feeding value and high yielding power, it should be more generally grown.—Lowest yields were obtained from emmer. There seems little justification for growing this crop in the western part of the State.—There was little difference between the values of spring wheat and early oats, either as a feed or cash crop.—Weed growth is usually less troublesome in early, than in late seedings.—*T. A. Kiesselbach.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

150. Anonymous. [Rev. of: MacLeod, Julius. The quantitative method in biology. Manchester University Press, and Longmans Green & Co. 1919.] Jour. Botany 57: 163-164. 1919.

151. Anonymous. [Rev. of: Thoday, D. Botany: a textbook for senior students. 2 ed., 8 vo. *xix + 524 p.* Cambridge University Press, 1919.] Jour. Botany 57: 164-165. 1919.

152. Anonymous. (Okefinokee Society.) Brooklyn Bot. Gard. Rec. 8: 146. Oct., 1919. News item, calling attention to the organization of the Okefinokee Society, with headquarters at Waycross, Georgia, for the purpose of securing all or part of the Okefinokee swamp as a permanent government reservation, to be used as a natural history museum, and a semi-tropical recreational and educational center.—*C. S. Gager.*

153. Anonymous. La coloration et la chute des feuilles a l'automne. [The coloration and fall of leaves in autumn.] Naturaliste Canadien 46: 49-50 Sept., 1919.—A popular statement of the fact that the autumn change of color in leaves and their fall is due to the natural process of growth completed, and not due to physical injury by frost or wind.—*A. H. MacKay.*

154. Anonymous. Teaching natural science in Norway. [Rev. of: Kyerskog-Agerzborg, H. P. The teaching of natural science in the primary and secondary schools of Norway. School and Society 9: 673-678. June 7, 1919.] Brooklyn Bot. Gard. Rec. 8: 147-148. Oct., 1919.

155. Bigelow, Maurice A. Children's gardening in the reconstruction period. Brooklyn Bot. Gard. Rec. 8: 133-138. Oct., 1919.—The primary purpose of children's gardens is not to produce useful plants, it is not to train professional gardeners, but it is to use the scientific methods of gardening as a very practical basis for important phases of cultural and useful education.—*C. S. Gager.*

156. Boulger, G. S. [Rev. of: Sahni, Birbal, and M. Willis. Preface by J. C. Willis. Lowson's text-book of botany (Indian edition) revised and adapted by these authors, London. *xii + 610 p.* W. B. Clive.] Jour. Botany 57: 324–325. 1919.

157. Davis, Bradley M. **Introductory courses in botany.** School Sci. Math. 19: 797–800. Dec., 1919.—Outline No. 4, College half-year course; begins with vegetative parts of seed plants, physiology. Later plants in evolutionary sequence. No. 5. Year course in agricultural college. Mainly physiology and ecology, details of phylogeny not studied, economic plants used as far as possible. No. 6. Twelve week college courses. Cyanophyaceae to Angiosperms. Morphology is emphasized, because facts can there be most clearly arranged.—*A. Gundersen.*

158. Gager, C. Stuart. **A basis for reconstructing botanical education.** Science 50: 263–269. Sept., 1919.—In deciding the content of an introductory course one should keep clearly in mind the purpose of education in general. The aim of education is not merely to give information, nor merely to teach somebody how to do something, nor to prepare young people to get a living, nor to get a living only by commercial pursuits. Public education should always adapt itself to the needs and ideals of the age. Mr. Rockefeller, Jr., has said "that every man is entitled to an opportunity to earn a living, to fair wages, to reasonable hours of work and proper working conditions, to a decent home, to opportunity to play, to learn, to worship and to love." Every subject in the curriculum therefore should, in its introductory course at least, have its content decided with reference to this entire modern ideal. The writer urges the desirability of offering, in all colleges, and universities, "cultural courses." We should never forget that one of the important aims of education is to enable the individual to find himself. The introductory courses should almost never be planned on the sole supposition that the student is to take more advanced courses. Public education should be planned, not solely with reference to utilitarian demands, but on a basis of broad culture as well.—*A. H. Chivers.*

159. Grier, Lt. N. M. **The poppies of Flanders fields.** Nat. Study Rev. 15: 342–343. Nov., 1919.

160. Herrmann. [Rev. of: Kraeplinn, K. **Naturstudien in Wald und Feld (Nature study in wood and field)** 4th edition, Leipzig and Berlin, 1918.] Forest. Rundschau 20: 15. 1919.

161. Herrmann. [Rev. of: Rosen, Felix. **Anleitung zur Beobachtung der Pflanzenwelt (Introduction to observations of the Plant World)** 2nd edition, Leipzig, 1917.] Forst. Rundschau 20: 7–8. 1919.—Popular booklet on general botany.—*F. S. Baker.*

162. Kolbe, F. C. **Some experiments used in the rudimentary teaching of botany.** South African Jour. Sci. 15: 576–579. 1919.—The first stage of every science is pure observation. We put nature to the torture to make her reveal her secrets. That is experiment. When by these means we come to final principles we argue from them and the science passes into the deductive stage. "Experiments" in rudimentary teaching are not experiments at all. They are simply demonstrations—and usually book-work demonstrations—under distorted conditions.—*E. P. Phillips.*

163. Nichols, G. E. **The general biology course and the teaching of elementary botany and zoology in American colleges and universities.** Science 50: 509–517. Dec., 1919.—The general biology course originated with Huxley and was introduced into this country by Martin. In the average general biology course the laboratory material is selected more or less indiscriminately from both plant and animal kingdoms, but with animal material greatly predominant. The study of animals alternates with the study of plants. The aim of such a course is not so much to bring out the fundamental characteristics of plants as plants and of animals as animals, but rather to demonstrate that the two are merely different expressions of matter in the living state, and that the same underlying biological principles are applicable to both. For a number of years it has been the conviction of the writer that a course

in general biology of the type specified above ought not to be offered to elementary students, either as a cultural study or in preparation for advanced work in botany and zoology. The article contains a summary of opinions obtained by a questionnaire which was sent to 105 botanists and 65 zoologists, and by a series of letters loaned by Professor Margaret C. Ferguson, of Wellesley College. In effect the opinion of many botanists and zoologists is that theoretically a course in general biology, such as the one mentioned above, may seem desirable; practically it is not. The reasons are as follows: (1) Such a course is too dependent for its success on the personnel of its teaching staff; (2) It is a hybrid course; (3) It lays too much stress on abstract principles and too little on concrete facts; (4) It tends to give the student the impression that he has something he does not possess; (5) For students who plan to take further work in either botany or zoology it is especially disadvantageous; (6) In an institution having two distinct departments such a course should not be given by one of these departments; (7) The general biology course owed its perpetuation, as it did its inception, primarily to the zoologists. The nature of elementary courses in the biological sciences should be as follows: there should be two distinct courses,—elementary botany or plant biology, taught by a botanist, and elementary zoology or animal biology, taught by a zoologist; each of these courses should aim to achieve a two-fold end. It should serve as an introduction to more advanced courses, and it should also satisfy the requirements of the student for whom it will constitute the only biological course. It is felt by many botanists and zoologists that special courses in the biological sciences should be arranged for the benefit of students who wish to take but one course in this field.—*A. H. Chivers.*

164. Shaw, Ellen Eddy. **Sixth annual garden exhibit for Brooklyn boys and girls.** Brooklyn Bot. Gard. Rec. 8: 138–142. Oct., 1919.

165. Weaver, J. E. **The quadrat method of teaching ecology.** Plant World 21: 267–283. *Fig.1–7.* 1918.—The value of the quadrat method of studying vegetation in the solution of economic and scientific field problems is discussed, and its usefulness in teaching ecology pointed out. Illustrative quadrat studies are presented, dealing with the vegetation of salt flats, prairies and ruderal associations.—*Chas. A. Shull.*

CYTOLOGY

Gilbert M. Smith, *Editor*

Geo. S. Bryan, *Assistant Editor*

166. Carter, Nellie. **Studies on the chloroplastids of Desmids.** I. Ann. Botany 33: 213–254. *Pl. 14–18.* 1919. II. *Ibid.* 33: 295–304. *Pl. 19–20.* 1919.—This investigation, based in part upon the extensive collections of G. S. West, is an attempt at the systematic study of the chloroplast structure in the different genera of the Desmids. The author finds that in the lower members of the family, the Saccodermae, the chloroplast is simple in structure whereas in the higher members of the Placodermae the chloroplast is frequently a complicated structure. In the species with complex chloroplasts the structure is usually constant for any species.—The number and position of the pyrenoids is determined by the size and shape of the chloroplast. When the chloroplast is of any size there are many pyrenoids. The number of pyrenoids is not constant in any semicell but the areas of pyrenoid formation are quite definite. Variation in pyrenoid number is dependent upon the varying physiological condition of the cell.—The nature of the chloroplast of several species in *Netrium*, *Closterium*, *Tetmemorus*, *Euastrum*, *Xanthidium*, and *Micrasterias* is discussed in detail.

167. Chamberlain, C. J. **Cytology of the basidium.** [Rev. of: Fitzpatrick, H. M. The cytology of Eocronartium muscicola. Amer. Jour. Bot. 5: 397–419. *3 pl.* 1918. (See Bot. Absts. 1, Entry 1322.)] Bot. Gaz. 67: 376. 1919.

168. Chamberlain, C. J. **Chromosomes in Carex.** [Rev. of: Heilborn, Otto. **Zur Embryologie und Zytologie einiger Carex-Arten. Embryology and cytology of several species of Carex.** Svensk Bot. Tidskr. 12: 212–220. *15 fig.* 1918. (See Bot. Absts. 1, Entry 1329; 3, Entry 38.)] Bot. Gaz. 67: 448. 1919.

169. Chamberlain, C. J. **Chondriosomes in plants.** [Rev. of: Mottier, D. M. **Chondriosomes and the primordia of chloroplasts and leucoplasts.** Ann. Botany 32: 191–214. *1 pl.* 1918. See Bot. Absts. 2, Entry 81.] Bot. Gaz. 67: 270–271. 1919.—The reviewer discusses the names that have been applied to chondriosomes and similar structures, preference being given to mitochondria and chondriosomes as most likely to survive; chondriosomes seems the best term, because most noncommittal. The author's claim that chondriosomes are concerned in the transmission of hereditary characters is thought not to be well supported.—*H. C. Cowles.*

170. Cleland, Ralph E. **The cytology and life-history of Nemalion multifidum, Ag.** Ann. Botany 33: 323–351. *Pl. 22–24, 3 fig.* 1919.—See Bot. Absts. 4, Entry 1016.

171. Coulter, J. M. **Embryo sac and fertilization in Oenothera.** [Rev. of: Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Botany 32: 279–317. *7 pl., 14 fig.* 1918. (See Bot. Absts. 1, Entries 482, 979, 980.)] Bot. Gaz. 67: 275–276. 1919.

172. Ensign, M. R. **Venation and senescence of polembryonic citrus plants.** Amer. Jour. Bot. 6: 311–329. *6 fig.* 1919.—See Bot. Absts. 4, Entry 1555.

173. Hitchcock, R. **Preliminary note on the differential staining of the cytoplasm of Characeae.** Bull. Torrey Bot. Club 46: 375–379. 1919.—See Bot. Absts. 4, Entry 1022.

174. Levine, Michael. **Sexuality in the Basidiomycetes.** [Rev. of: Bensaude, Mathildae. **Recherches sur le cycle evolutif et la sexualité chez les Basidiomycetes.** *P. 1–16. Pl. 1–13, fig. 1–30.* Nemours, 1918.] Mycologia 11: 280–283. 1919.—See Bot. Absts. 4, Entry 1121.

175. Molisch, Hans. **Beiträge zur Mikrochemie der Pflanze.** [**Contribution to the microchemistry of plants.**] Ber. Deutsch. Bot. Ges. 36: 474–481. 1919.—See Bot. Absts. 4, Entry 1000.

176. Péchoutre, F. **Revue de botanique.** [**Review of Botany.**] Rev. Gen. Sci. Pures et Appliquées 30: 242–250, 1919.—A general review of papers in "the four languages" on the cell, morphology and anatomy, carbon assimilation, parasitism, symbiosis, reproduction and parthenogenesis, and the thallophytes. Under this last heading are treated sexuality in the Basidiomycetes, a parasitic Laminaria, and alternation of generations in the brown algæ.—*G. J. Peirce.*

177. Pujiula, Jaime. **Algunas observaciones citológicas, sobre todo en Hedera Helix y Solanum tuberosum, y la primera variante del método tano-argéntico, introducida por el Sr. del Rio-Hortega. [Certain cytological observations, chiefly on Hedera Helix and Solanum tuberosum, and the first variation, introduced by Sr. Rio-Hortega, of the argentic tannate method.]** Broteria: Ser. Bot. 17: 67–96. *2 pl., 17 fig.* 1919.—This study was undertaken to verify certain statements concerning plastids, and to estimate the reliability of a method of staining. Most of the work was done upon *Hedera Helix* and *Solanum tuberosum*, although *Agave* sp., *Pittosporum undulatum*, *Cornus mas*, and the roundworm (*Ascaris megalocephala*) were also investigated. Results were checked in all cases by comparing preparations with living material. The cell structure is much broken up by the shock of sectioning, and care must constantly be used to avoid misinterpretation. The "metodo tano-argentico" passes paraffine sections through warm aqueous solutions of tannin, weak ammonia, ammoniacal silver, distilled water, gold chloride, and sodium hypochlorite. Protoplasmic granules, plastids, and starch grains color clearly. Karyokinetic figures show with especial distinctness, the intense blackish coloration permitting excellent photographic record. Resting nuclei

give less satisfactory results, the color concentrating in patches. Cells containing much albumen become wholly opaque. Starch grains color pinkish, cell membranes are usually colorless. Alcoholic material appears to give better results for starch coloration. In general, the method of staining, while presenting much value for study of certain structures, starch grains, etc., possesses little power of differentiation for many structures and must be used with caution.—The starch grains of *Hedera Helix* appear to be a new form of this substance; they stain brownish yellow with iodine and do not show concentric layers. The author discusses at length the protoplasmic granules stained by this method and concludes that they may perhaps be mitochondria, without postulating anything about their identity with animal structures; the term microsome could also be used. He thinks it more probable that these granules are similar in nature to leucoplasts, i.e., miniature leucoplasts; since both divide by constriction, and both produce starch. This conclusion is based upon a series of transition stages between granules and starch grains. Dangeard's ideas about vacuoles seem unworthy of recognition.—A bibliography of forty-two titles is given.—*Edward B. Chamberlain.*

ECOLOGY AND PLANT GEOGRAPHY

Henry C. Cowles, *Editor*

Geo. D. Fuller, *Assistant Editor*

GENERAL, FACTORS, MEASUREMENTS

178. Bates, C. G. **A new evaporimeter for use in forest studies.** Monthly Weather Rev. 47: 283–294. *Fig. 1–6.* 1919.—The author discusses the factors which influence evaporation or transpiration from plants and the conditions which must be met before water losses from plants can be determined through instrumental methods. The "evaporation stress" or tendency to evaporate is produced by a different combination of factors in each body in which evaporation may occur in leaves. The vaporizing process takes place on the surface of the moist cell walls not directly exposed to moving air, so that the effect of wind is greatly minimized in leaf evaporation, the rate of diffusion being controlled by vapor pressures in the inter-cellular spaces. Evaporation from leaves is more directly controlled by radiant energy than from a body which does not absorb so readily, and may obtain considerable heat from air. Efforts were made to devise an instrument having the same relation to wind and radiant energy as do leaves of plants, with the idea of an "inner cell" for the vaporizing process, rather than a full exposed moist surface. A practical metallic instrument was devised, in which the essential feature is a moist layer of linen between two metal plates; the upper plate protects the wick from rain, being coated with lamp black and transmitting absorbed heat to the wick; the lower plate is thick and contains a number of small perforations simulating the stomata of leaves. Vapor formed in the moist linen escapes through these perforations. The linen is kept moist by a stem wick from a distilled water supply, and evaporation losses are obtained by weighings. Evaporation from this instrument follows the transpiration from small coniferous trees used in the experiment much more closely than do other types of evaporimeters. The objectionable feature of this instrument lies in its exposing a horizontal surface to evaporation. This may be an advantage if plant activity becomes less as the season advances, the instrument at the same time exposing its absorbing surface less squarely to the sun's rays.—*E. N. Munns.*

179. Blair, Thomas Arthur. **Influence of snow cover on the temperature distribution in Utah, January, 1919.** Monthly Weather Rev. 47: 165–166. 1919.—Portions of Utah normally covered with snow were bare in the early winter of 1919 and other portions usually bare were covered with snow. Temperature records show that with snow negative departures of both mean maximums and mean minimums were from 4° to 22°, while without snow the departures were positive and ranged from 2° to 13°.—*E. N. Munns.*

180. Brown, W. H. **Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes.** Philippine Bureau Sci. Publ. 13: 1–434. *Pl. 1–41, fig. 1–30.* 1919.—The author holds that the different types of vegetation found on tropical mountains are the result of the environment and correlates the physical types at different elevations with measurements of the environmental factors. The greater part of the publication is taken up with Mount Maquiling. Between elevations of 100 to 600 meters on this mountain is found a tall, three-story dipterocarp forest, a type of Schimper's tropical rain forest. Here the epiphytes are largely phanerogams and are confined chiefly to the largest branches of the tallest trees. The ground covering consists mainly of tree seedlings. At greater elevations the height of the trees decreases, the number of stories becomes less, epiphytes more abundant, and the ground covering more mesophytic; at the top there is a mossy forest composed of a single story of dwarfed, peculiarly shaped trees which are thickly covered with mosses and moss-like plants, and there is a ground covering of mesophytic herbs. The measurements of the environmental factors are very detailed and cover a continuous period of two years. The temperature and humidity were measured near the ground in six stations. Temperature was also measured in various situations in trees, by means of maximum and minimum thermometers. Evaporation was measured by Livingston atmometers near the ground, in the top of the canopy of the forests at different elevations, and in the various tree stories. Light was measured in five stations by means of radio-atmometers.—Temperature and light intensity decrease with rising elevations and the rates of growth and the heights of the trees at different elevations show a general agreement with the light-temperature indices—that is, with the product of light intensity multiplied by temperature indices for growth. Evaporation decreases with the increasing altitude, while the heights of the trees and rates of growth also decrease. Near the base of the mountain, however, it would appear that evaporation is high enough to be detrimental to the vegetation. Rainfall is greatest at middle elevations so that it would seem that the development of epiphytes is dependent on lower rates of evaporation and greater cloudiness rather than on high rainfall. The moisture content of the soil increases with rising elevations and it is only at the base of the mountain that it ever becomes low enough to be harmful to the vegetation. The increased moisture content of the soil and the lower rate of evaporation account for a greater degree of mesophytism in the ground covering at high than at low altitudes.—An account of the vegetation and measurements of environmental factors on Mount Banahao are also included. Here the dwarfing is more gradual than on Mount Maquiling and temperature indices for growth would appear to be sufficient to account for the dwarfing.—From these results it would seem that when dwarfing is gradual, on moist tropical mountains, it may be accounted for by decreases in temperature but that when it is rapid it is due to a combination of low temperature and low light intensity.—Near and at the top of Mount Banahao the rainfall is heavier than anywhere on Maquiling but cryptogamic epiphytes are not as well developed anywhere on Mount Banahao as at the top of Maquiling. This is due to the fact that on Mount Banahao the humidity is lower and clouds less frequent than on Mount Maquiling, and emphasizes the fact that epiphytes may not be proportional to rainfall.—The writings of many botanists would lead one to believe that they consider tropical vegetation as peculiar, and temperate vegetation as more normal. The writer brings forward a number of reasons for holding that the reverse is true; that is, that tropical vegetation is a generalized type and temperate zone vegetation a specialized one suited to the alternation of summer and winter seasons.—*E. D. Merrill.*

181. Burns, George P. **Weather conditions and plant development.** Mem. Brooklyn Bot. Gard. 1: 119–122. June, 1918.—The author maintains that the effect of weather conditions presents a problem essentially physiological, and therefore one which is to be investigated by accurate experiments under controlled conditions. Mention is made of several methods employed in the past in attacking these problems, and it is shown that conclusions based on general averages are apt to be useless, because such averages conceal the essential facts. The author emphasizes strongly the importance of studying the conditions that obtain during critical periods.—*P. D. Strausbaugh.*

182. CHURCH, A. H. **The plankton-phase and plankton-rate.** Jour. Botany 57: Suppl. III. 1–8. 1919.—The term plankton was proposed by Victor Hensen in 1887 for the floating population of the sea, and has become a fundamental conception of the greatest biological interest. The author deplores the extension of the term to limits not originally intended. The subject is degraded by its application to "Limnoplankton" of a pond, "Saproplankton" of dirty water or such curious expressions as the Cryptoplankton of algae found in snow. Plankton is more physiological than morphological, and relates to the problem of the food supply of the sea. Free unicellular forms of plant life are about all that is left under the term. The amount of such organic life is very great. Gran recorded 5–6 million per liter in milky water of Christiania Fjord. Generally, maximum plankton content occurs where coastal waters bring down land-debris. The deep blue of the ocean indicates a poor flora and fauna. In a liter of Kiel Bay water Lohman found a total of over $2\frac{1}{2}$ millions of organisms.—The plankton represents the oldest life on the planet, occurring as it did in the sea before benthic life began. Higher organisms still retain a plankton phase in their life history, which is a kind of recapitulation of their race history. To such a phase belong ovae, spermatozoids, gametes of all kinds, and spores. In the Siphonogamia and a few fungi alone is the plankton stage practically eliminated.—We may visualize the plankton rate as expressed by the amount of cytoplasm in one million zoids per liter. With such a unit, quantities of plankton often dissimilate in nature may be compared. A fair plankton rate may about equal the ionization of water; but there is no causal relation, since the mass of water can replace the ions, while the plankton is limited by scarcity of nitrogen and phosphorus. In the Sargasso Sea, the sea-weed uses most of the available N. and P. ions, and plankton life is thus very much reduced. However, the factors determining the amount of plankton a sea can carry are yet obscure. While of no exact scientific value at present, such considerations as the "mean plankton-rate" may be useful in establishing some general basis for the consideration of the phyto-plankton and phytobenthos of the British coasts. A bibliography is appended.—*K. M. Wiegand.*

183. DUFOUR, LEON. **Les stations du Physomitra esculenta dans la forêt de Fontainebleau [France]. [Stations of Physomitra esculenta in the forest of Fontainebleau.]** Bull. Trimest. Soc. Mycolog. France 35: 142–143. 1919.—The author comes to the conclusion that two principal conditions seem to be necessary for this fungus. (1) a stand of pine-trees; and (2) a large amount of air and light.—*Fred C. Werkenthin.*

184. FULLER, GEORGE D. **Maps of rainfall and crop plants.** [Rev. of: (1) KINCER, JOSEPH B. **Atlas of American agriculture. Advance sheet 1: Precipitation.** U. S. Dept. Agric. Weather Bureau 1917; and (2) FINCH, V. C., AND O. E. BAKER. **Geography of the world's agriculture.** 10×13.5 inches. *149 p. 207 fig.* 1917.] Bot. Gaz. 67: 102–103. Jan., 1919.

185. GINZBERGER A. **Beiträge zur Naturgeschichte de Scoglien und Kleineren Inseln Süddalmatiens. [Natural history of the "Scoglien" and smaller islands of southern Dalmatia.]** Denkschr. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 92: 261–405. *Pl. 1–8.* 1916.—This contains a chapter on fungi by K. v. KEISSLER, one on lichens by A. ZAHLBRUCKNER [see Bot. Absts. 4, Entry 2557], one on mosses by JULIUS BAUMGARTNER, one on liverworts by V. SCHIFFNER [see Bot. Absts. 3, Entry 1589], and one on higher forms by A. BÜRGERSTEIN.—*H. M. Fitzpatrick.*

186. GLEASON, H. A. **What is ecology?** Torreya 19: 89–91. 1919.—Ecology is defined as the accumulation and organization of knowledge concerning the correlation between the plant and its normal environment. It is often confused with morphology and physiology. These deal only with the structure and behavior of the plant, while ecology should consider these solely in correlation with the environment.—*J. C. Nelson.*

187. HARPER, ROLAND M. **A new method of mapping complex geographical features, illustrated by some maps of Georgia.** School. Sci. Math. 18: 699–708. *4 fig.* Nov., 1918.—Author describes "a quantitative regional method" of mapping features such as soils, vege-

tation, crops, etc. Four maps of Georgia are given showing geographical divisions, soil types, tree distribution and leading crops, as an illustration of how this method of mapping is to be applied.—*P. D. Strausbaugh.*

188. Hartzell, F. Z. **Comparison of methods for computing daily mean temperatures: effect of discrepancies upon investigations of climatologists and biologists.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 68: 1-35. *Pl. 1-2. fig. 1-19.* 1919.—Using the data from a complete thermograph record of the temperature at Fredonia, N. Y., for the year 1916, the author has calculated mean daily, mean monthly, and mean annual temperature by different methods and made a statistical study of the results. Means based on maximum and minimum temperatures were found to differ more or less from means obtained by dividing the sum of the hourly temperatures for each day by twenty-four (thermograph averages). This difference varied considerably with the hour at which the reading of maximum and minimum temperatures was made, being greatest for 5 p.m. readings, less for 8 p.m. readings, and least for midnight readings. Assuming the thermograph average to be the true mean, the error of daily means calculated by the other method may be so large as to make them practically worthless for use in biological investigations requiring close comparison of temperature data from day to day. Even monthly means so calculated may be so inaccurate as to introduce important errors into ecological work; but the error of the annual mean is negligible. The study also brought out clearly the fact that temperature averages admit of comparison only when calculated from readings taken at the same hour.—*F. C. Stewart.*

189. Hesselman, Henrik. **Om vara skogsföryngringsatgarders inverkan pa salpeterbildningen i marken och dess betydelse for barraskogens föryngring. [Influence of silvicultural practice on soil nitrification and its importance in the reproduction of coniferous forests.]** Skogsvårdsfören. Tidsskr. 16: 1-104. 1918. The lack of reproduction in many Swedish coniferous forests is due, not to any moisture relation, but to a lack of available nitrogen, the transformation of nitrogenous compounds ceasing with the production of ammonia. These soils are mostly acid in reaction, and are not favorable habitats for nitrifying bacteria, especially *Azotobacter*, which requires soils rich in certain salts, especially calcium. Various lichens and mosses, so abundant in these coniferous forests, are indicators of nitrogen deficiency, as are such plants as *Aira flexuosa*, *Arctostaphylos uva-ursi*, and species of *Vaccinium.* Among the indicators of abundant available nitrogen are *Epilobium angustifolium* and *Rubus idaeus.* [See Bot. Absts. 2, Entry 653, also full review by Pearson in Jour. Forestry 17: 69-73. 1919.]—*H. C. Cowles.*

190. Hutchinson, A. H. **Limiting factors in relation to specific ranges of tolerance of forest trees.** Bot. Gaz. 66: 465-493. *7 fig.* Dec., 1918.—From data accumulated in personal contact with the forests of northern Ontario, supplemented by the records of such Canadian explorers as Bell, Macoun and Low, the author considers the factors efficient in limiting the range of the principal trees composing the forests of eastern Canada. The northern limits of 20 species are plotted upon maps showing temperature and precipitation distribution, and various peculiarities of these limits are discussed. Temperature seems to explain the northern limits of a few species only, the principal ones being *Picea mariana*, *Larix americana* and *Betula papyrifera*, although for these species another factor seems to be involved in Labrador. Water is regarded as the limiting factor in the western extension of *Acer saccharum*, *Tsuga canadensis*, *Fagus americana*, *Thuja occidentalis* and *Ulmus americana*, but other species show irregularities which do not correspond in the least with the water supply. The most important conclusion regarding the time factor in relation to temperature and soil development is embodied in the statement that "deciduous hardwood forest is encroaching upon the coniferous forest region, and that the progress of this encroachment has lagged behind temperature changes, being now dependent upon the rate of soil development."—There follows a discussion of the ranges of tolerance for various species. In this discussion it is interesting to note that *Abies balsamea* is regarded as possessing a wide water range but as seldom thriving except in very moist soil on account of fungous diseases of the roots in drier soil. *Picea canadensis* and *Picea mariana*, possessing the same northward range, are frequently separated by

soil development and soil water the latter species having the wider range of tolerance.—The distribution of *Thuja occidentalis*, while defying explanation on the basis of temperature, water or soil as limiting factors, seems to be explicable on the theory that it has radiated from a limited central area and that migration is still lagging behind ecological conditions. *Pinus Banksiana* on the contrary is regarded as a pioneer form more tolerant of severe conditions than of competition. This accounts for its absence from areas of better soil development.—*Tsuga* is regarded as still migrating and hence showing limits by time rather than by factors of its present environment. Notes are also given on the specific ranges of tolerance of *Larix americana*, *Pinus Strobus*, *Populus balsamifera*, *P. tremuloides*, *Acer saccharum*, *Fagus americana*, *Ulmus americana*, and *Betula lutea*. [See also Bot. Absts. 2, Entry 17.]—*Geo. D. Fuller.*

191. Johnston, Earl S. **A simple non-absorbing atmometer mounting.** Plant World **21**: 257–260. *Fig. 1.* 1918.—A description is given of a mounting that will prevent the absorption of rain and is simpler and less liable to breakage than those previously devised. The principal improvements are the elimination of one of the two mercury valves formerly used and the use of but one tube from the reservoir to the cup. It is claimed that the mounting may be made without employing the services of a skilled glass-blower. Simple but complete directions for its construction are accompanied by a diagrammatic drawing of it as installed. [See also Bot. Absts. 2, Entry 551.]—*Geo. D. Fuller.*

192. Kincer, Joseph Burton. **Relation between vegetative and frostless periods.** Monthly Weather Rev. **47**: 106–110. *Charts 1–8, fig. 1–5.* 1919.—Vegetative temperature defines the potential period of plant growth determined by the spring date when the temperature rises sufficiently to permit action by the protoplasmic content of vegetable cells and the date in the fall when it falls below this point and growth ceases. The frostless period is determined by the dates of the last killing frost in spring and the first in autumn. The average frost-free date both in spring and in fall corresponds to a mean daily temperature of from 52° to 56°, and, when away from marine influence, these values are very uniform under both topographic conditions and over large geographic areas. The average frost date can be more accurately determined from the mean temperatures than from the frost records themselves which are often misleading.—A law of frost occurrence is deduced: "Killing frost occurs each year in spring until the normal mean daily temperature rises to approximately 43°. After this temperature is reached, frost does not occur in all the years, but does occur in more than half the years until the average temperature reaches 54°, which corresponds in data to the average occurrence of the last frost in spring. Thereafter killing frost may be expected with less frequency, or in less than half the years, until the mean daily temperature rises to approximately 63°, after which it is not experienced. This holds good also for fall frost."—Plotting the annual march of temperature and average spring and fall frost dates for successive belts of 3° latitude in width from 29° to 49°, between the Rockies and the Appalachians, a series of paralleled curves results in which the line through frost dates is essentially parallel to the vegetative temperature line of 43°, and 9° higher. The lengths of the seasons are widely divergent, the frostless season varying from 20 days from the northern end of the Mississippi Valley to 100 days in the southern.—*E. N. Munns.*

193. Korstian, C. F. **Life forms, leaf size and statistical methods in phytogeography.** [Rev. of: Smith, Wm. G. Raunkiaer's life forms and statistical methods. Jour. Ecol. **1**: 16–26. 1913.] Jour. Forestry **17**: 328–331. 1919.

194. MacKay, A. H. **The phenology of Nova Scotia, 1917.** Proc. and Trans. Nova Scotian Inst. Sci. **14**: 395–402. 1919.

195. McGregor, E. A. **The relation of irrigation to humidity in a recently reclaimed desert.** Plant World **22**: 45–52. *3 fig.* 1919.—A study of the average monthly humidity of the Imperial Valley during 1916–1918, and of the relation between irrigation and humidity shows that irrigation has little to do with the humidity of the atmosphere. The humidity curve

for San Diego for the same period is very similar to that of the Imperial Valley, although it is over 100 miles away. The conclusion is reached that no appreciable influence upon the course of humidity through the season is exerted by the amount of irrigation water used. Seasonal humidity fluctuations are to be accounted for through geographically far-reaching meteorological factors.—*Chas. A. Shull.*

196. McLean, R. C. **Studies in the ecology of tropical-rain forest: with special reference to the forests of south Brazil. I. Humidity.** Jour. Ecol. 7: 5–54. *21 fig., 1 pl.* May, 1919.—This work was done in the rich forests on the slopes of the hills near Rio de Janeiro, Brazil, a region shown to possess a high average humidity, a mean rainfall of 111.2 cm. (the heaviest rains occurring during the hot months), and a very considerable amount of cloudiness wh ch is also at its height during the hot season. The combination into a single graph of the factors of temperature, rainfall, relative humidity, and sunshine proves the climate to be decidedly periodic, with the most favorable portion of the year for plant development falling within the months extending from December to May. Graphs show that the relative humidity is always high not only within the forest at heights of one and four meters above the soil, but also outside the forest and above the foliage-canopy. Thermographic studies within the forest disclose the fact that the dense layer of terrestrial shrubs seems to divide it into two portions, the lower possessing a climate decidedly cooler and more humid than the brighter regions above. The author conceives that this lower stratum possesses the conditions most unfavorable to vegetation and to it his experimental work is confined.—Experiments show that the highest rate of water loss by transpiration from shade leaves in the lower stratum of the forest is never greater than 0.4 of the evaporation from a free water surface exposed under exactly similar conditions. Transpiration experiments conducted in the laboratory with atmospheric saturation and strong light gave very similar results. Cuticular transpiration from the shade type of leaf is shown to be very slight on account of a rather remarkable amount of cutinization. A comparison of the shade and the sun form of leaves on the basis of intercellular space relative to leaf mass shows that in the former it amounts to 24.8 and in the latter to 16.3 per cent. Data were obtained upon the number and size of stomata for undergrowth plants and seem to show that both are rather smaller than in the typical mesophytes of temperate lands. The vascular strands of the petioles of the leaves of such plants are found to be much smaller than those in sun species. These and other data tend to show that in the shade leaves of the forest both the power of root absorption and of conduction are decidedly small and most inadequate to the transpiration capacity of the leaves, hence transpiration even in the protected region of forest undergrowth may, for short periods at least, rise above the low capacity of the plant to supply water. This the author interprets as leading to the development of protective devices even in a very moist habitat.—Under such conditions of depressed transpiration there is, however, no shortage of mineral matter, but on the contrary the leaves of the shade habitats show a relatively richer content than do the heliophytes, proving that here, at least, the absorption of mineral salts is quite independent of foliar evaporation.—In addition to these experimental results there appear in the paper many observations of interest among which may be cited records of the abundance of pulvini, the predominance of the lanceolate leaf-form and the non-importance of the drip-tips of the foliage.—*Geo. D. Fuller.*

197. Pavillard, J. **Les progrés de la nomenclature dans la géographie botanique. [The development of nomenclature in phytogeography.]** Ann. Géog. 27: 401–415. 1918.—The author begins with an historical and critical sketch of the conditions of the past and then proceeds with an analysis of the scope of plant geography. Here it is suggested that it would be desirable to follow the practice of the Swiss school and employ the designation "geobotany" suggested by Grisebach in 1866. Resting upon the two fundamental unities of the species and the association, two main divisions of the science are then made, the one termed geobotany the other plant sociology or phytosociology. Each of these is further subdivided into three parts, giving as the subdivisions of the subject: (1) Floristic geobotany; (2) Genetic geobotany; (3) Ecologic geobotany; (4) Floristic phytosociology; (5) Genetic phytosociology; and (6) Ecologic phytosociology.—*Geo. D. Fuller.*

198. Raunkiaer, C. **Über das biologische Normalspektrum.** [Normal biological spectrum.] Kgl. Dansk. Vidensk. Selskab. Biol. Meddel. 1[1]: 17 p. 1918.—The author suggests certain changes for the simplification of his life-form system of classification and adds more data to the application of his normal biological spectrum. Analyzing floras from such widely different regions as Denmark, Spitzbergen, Death Valley (Calif.), Georgia, Seychelles, and Alaska he finds that not all of his life-forms are essential to the characterization of their phytogeographic climates. For the purpose of such characterization he finally reduces his ten life-forms to four, viz., phanerophytes, chamaephytes, hypogeal plants and therophytes. The recalculation of a normal spectrum upon the basis of many more species than originally used for that purpose proves that the earlier calculation was quite accurate. A study of the great taxonomic groups of plants shows that the calculated and experimental results agree and that while the Gymnospermae and Choripetalae are essentially phanerophytic, the Monocotyledonae are characteristically hemicryptophytic and cryptophytic while the Gamopetalae possess a majority of hemicryptophytes. [See also Bot. Absts. 4, Entry 301.]—*H. de Forest* and *Geo. D. Fuller.*

199. Reed, William Gardner. **Frost and the growing season.** Atlas of Amer. Agric. Part II, Sect. 1. *11 p. 33 fig.* 1918.—A series of shaded maps of the United States showing: (1) the average dates of the last killing frost in spring for the different portions of the country; (2) number of times in the given period when the first killing frost of spring was 10 days or more later than the average date; (3) average dates of first killing frosts in fall; (4) number of times in the given period when the first killing frost in fall was 10 days or more earlier than the average date; (5) dates on which the chance of killing frost in spring falls to 10 per cent; (6) dates on which the chance of killing frost in fall rises to 10 per cent; (7) number of times in the period when the season without killing frost was 15 days or more shorter than the average; (8) average number of days without killing frost; (9) available growing seasons in four-fifths of the years. Other interesting data concerning the time of occurrence of killing frost in specific years and places, are mapped and charted. Most of the data is obtained from frost records extending over a period of twenty years (1895–1914). Full rev. by Ward in Geog. Rev. 7: 339–344. 1919.—*P. D. Strausbaugh.*

200. Reidy, Margaret M. **Ecology.** School Sci. Math. 19: 131–134. Feb., 1919.—A paper dealing with the pedagogical aspects of ecology.—See Bot. Absts. 2, Entry 894.

201. Roig, Juan T. **Las maderas de Isla de Pinos.** [Kinds of wood on the Isle of Pines.] Revist. Agric. Com. y Trab. 2: 498–500. *1 fig.* 1919.—In the course of a collecting trip through the Isle of Pines there were collected 19 samples of wood not in their collection, 150 herbarium specimens and a considerable number of seeds of forest plants. Note was also made of a hundred common names not at present in catalogues and dictionaries. In general the species of trees found were the same as those in certain similar sections of Cuba. In the trip not a single marabou plant was seen. The mallows, *Urena lobata* and *U. sinuata,* were especially abundant about New Gerona. Attention is called to the fact that "sabina de costa" is nearly extinct both in Cuba and the Isle of Pines.—*F. M. Blodgett.*

202. Rowlee, W. W. **Relation of marl ponds and peat bogs.** Mem. Brooklyn Bot. Gard. 1: 410–414. *3 fig.* 1918.—Two types of filled in lakes and ponds occur in western New York: the peat bog and the marl pond. These differ in respect to the character of the water, the flora of the water, and the manner of filling. Finding many of the peat bogs underlain with marl, the author raises the question as to the possibility of such bogs having previously contained alkaline water which subsequently became non-alkaline. As most of the marl ponds occur in the region near the limestone belt of central New York, and the peat bogs with the greatest amounts of marl under them also occur near this same limestone belt, the author thinks that the above mentioned change has taken place. To quote his words, "The ponds were artesian pools fed by these springs and as the character of the water changed, there was, if our theory is correct, a corresponding change in the flora." *Chara,* a lime-loving plant, removes free lime from the water; rain washes out the lime from the soil, so that eventually the lime content of the pond water would be decreased, and conditions would arise favoring the development of an oxylophyte flora.—*P. D. Strausbaugh.*

203. Sauvageau, Camille. **Recherches sur les laminaires des côtes de France.** [Kelps of the coast of France.] Mem. Acad. Sci. France 56: 240. *85 fig.* 1918.—In this paper the details of the life histories and of the morphology of *Saccorhiza bulbosa*, *Laminaria flexicaulis*, *L. Lejolisii*, *L. Cloustonii*, *L. saccharina* and *Alaria esculenta* occupy most of the space and are elucidated by many drawings. There are also notes on the distribution and on the seasonal development that are interesting to the ecologist.—*Geo. D. Fuller.*

204. Smith, W. G. **Presidential address before the British Ecological Society.** Jour. Ecol. 7: 110–116. May, 1919.—The author points out the importance of ecology in solving many of the fundamental problems upon which the economic development of the country depends. Attention was also directed to the increasing tendency in ecological studies to lay stress upon biological factors. Many such factors tend to reduce growth forms from phanerophytes to chamaephytes and ultimately to hemicryptophytes. Prominent among such factors stand fire and grazing, which were shown to be influential in causing the encroachment of grasslands upon forests in such regions as the prairies of North America and the veld of South Africa. In these grasslands certain species appear again and again, probably because: (1) They possess in a high degree the power of shoot production at or near the surface of the soil, resulting in quick renewal after burning or grazing. (2) They are of perennial habit. (3) They have great power of surviving critical periods of winter and drought, as well as having considerable adaptability to habitat.—*Geo. D. Fuller.*

205. Toumey, J. W. [Rev. of: Sampson, A. W. **Climate and plant growth in certain vegetative associations.** U. S. Dept. Agric. Bull. 700. 1918. (See Bot. Absts. 1, Entry 1155; 2, Entry 226.)] Jour. Forestry 17: 59–62. 1919.—Valuable data have here added to our knowledge of site factors and vegetation through the experiments conducted in the various vegetative types in central Utah, though the correlation fails to bring us to an acceptable method of relating forest vegetation to the complex of physical factors which constitute the environment.—*E. N. Munns.*

206. Truog, E. **Soil acidity: 1. Its relation to the growth of plants.** Soil Science 5: 169–195. 1918.—See Bot. Absts. 1, Entry 1393.

207. Weaver, J. E. **The quadrat method of teaching ecology.** Plant World 21: 267–283. *7 fig.* 1918.—See Bot. Absts. 4, Entry 165.

208. Williams, Katherine A. **A botanical study of skunk cabbage. Symplocarpus foetidus.** Torreya 19: 21–29. *2 pl., 13 fig.* Feb., 1919.—A general study, largely morphological, but with notes on phenology, distribution, and pollination.—[See Bot. Absts. 2, Entry 981.]

STRUCTURES, BEHAVIOR, SYMBIOSIS

209. Anonymous. **Dwarf shore floras.** Amer. Bot. 25: 31. 1919.—Land plants that happen to sprout on the shores of rivers and ponds often show dwarfing effects due in part to the withdrawal of water and in part to their becoming established late in the season.—*W. N. Clute.*

210. Arnell, H. Wilh. **Vårfloran vid Hernösand.** [The springflora around Hernösand, northern Sweden.] (Swedish.) Bot. Notiser 1918: 169–209. *Tab. 1–3.* 1918.—The time of anthesis of 190 spring flowers, and in many cases also the time of opening of the leaf-buds, are given, together with other notes. The records were kept during the years 1875–1881. A comparison is also made between the dates of the appearance of spring at Jömköping, Upsala, Gefle, and Hernösand, the difference in latitude counted from the first named city being respectively 2, 3, and 5 degrees and the difference in the dates of beginning of spring being 8, 13, and 34 days respectively.—*P. A. Rydberg.*

211. Bradshaw, R. V. **Variations in Calypso.** Amer. Bot. 25: 152. 1919.—*Calypso bulbosa* reported to vary in fragrance with the locality.—*W. N. Clute.*

212. Burkill, I. H. **Some notes on the pollination of flowers in the Botanic Gardens, Singapore, and in other parts of the Malay Peninsula.** Gardens' Bull. Straits Settlements **2**: 165–176. 1919.—An account is given of observations on flowers visited by *Xylocopa*, *Anthophora*, *Melipona*, *Vespidae*, butterflies and moths, and sun-birds.—*S. F. Trelease.*

213. Cannon, W. A. **Root-growth of Prosopis velutina and Opuntia versicolor under conditions of a small oxygen supply in the soil.** Carnegie Inst. Washington Yearbook **16**: 82–83. Feb., 1918.—In *Prosopis* growth continued for some time in an atmosphere of 2.67 per cent oxygen, but in *Opuntia* it stopped promptly. In an atmosphere of 4.56 per cent oxygen the longer roots of *Prosopis* continued growth for five days while those of *Opuntia* ceased entirely at the end of 48 hours.—*Geo. D. Fuller.*

214. Cannon, W. A. **Relation of the rate of root growth of Prosopis velutina to the temperature of the soil.** Carnegie Inst. Washington Yearbook **16**: 82. Feb., 1918.—Growth in this species occurred at temperatures ranging from 12°C. to 42°C. with an optimum at 34°C. The rate of growth was also found to be correlated with the length of the root being greater in roots less than 50 mm. in length.—*Geo. D. Fuller.*

215. Cremata, Merlino. **Plantas melíferas. [Melliferous plants.]** Revist. Agric. Com. y Trab. **2**: 140–152. *10 fig.* 1919.—A list of plants in Cuba visited by bees arranged alphabetically by families is given with notes on importance, time of flowering, and distribution. —*F. M. Blodgett.*

216. Denis, Marcel. **Sur quelques thalles d'Aneura dépourvus de chlorophylle. [On certain thalli of Aneura devoid of chlorophyll.]** Compt. Rend. Acad. Sci. Paris **168**: 64–66. *2 fig.* Jan., 1919.—While *Aneura* commonly harbors an endophytic fungus, comparable to mycorhiza in vascular plants, the species here described has an unusual development of endophytic fungi. Apparently as a result of this symbiosis, the liverwort is without chlorophyll and has a coralloid appearance, and thus appears to depend upon the fungus for its nourishment. Comparison is made with the gametophyte of *Lycopodium*, which also may or may not possess chlorophyll, depending on the species. [See Bot. Absts. 2, Entry 982; also rev. by Magrou in Bull. Trimest. Soc. Mycol. France **35**: 164. 1919.]—*H. C. Cowles.*

217. Dosdall, Louise. **Water requirement and adaptation in Equisetum.** Plant World **22**: 1–13, 29–44. *5 fig.* 1919.—The current views of bog xerophytism are summarized. From a study of the soil water requirements and transpiration of *Equisetum fluviatile* as compared to *Ranunculus sceleratus* and *Helianthus annuus*, the author concludes that *E. fluviatile* is not to be considered a xerophyte growing in xerophytic parts of bogs because of low absorptive powers, but is a true hydrophyte, possessing only superficial xeromorphy. It is thought that the superficial xerophytic appearance of *Equisetum* was acquired in some cold, arid period of geological history, and that the structures are extremely stable. Adaptation to hydrophytic conditions has come about through the development of air spaces, diaphragms, and permanently open stomata, without modification of the external xeromorphy. Transpiration is twice as rapid per unit area in *E. fluviatile* as in the sunflower which is noted for its rapid use of water. It therefore belongs in the hydrarch succession, to the reed swamp or sedge-swamp association. *E. hyemale* and *E. arvense* are more mesophytic. High transpiratory activity of *E. fluviatile* is correlated with low photosynthetic efficiency as compared to *Phaseolus vulgaris* and *Ranunculus*.—*Chas. A. Shull.*

218. Farr, C. H. **The ferns of the rain-forest.** Sci. Monthly **9**: 19–31. *30 fig.* 1919.—Tree ferns grow in the most evenly tempered climates and cannot endure strong winds nor direct sunlight. The mountain forest of the tropics furnishes ideal conditions for them. In the old world tree ferns are distributed between 47 degrees south and 32 degrees north latitude. They are most abundant in Australia and the Pacific Islands, although numerous in Ceylon, Java and New Zealand. In the western hemisphere, their distribution is from about 44 degrees south to 25 degrees north latitude. The Hawaiian Islands, the Antilles, the Andes,

and Central America have many, but they are abundant in Jamaica. There are four genera and about 200 species in the family Cyatheaceae, not all of which are tree ferns. Cyathea reaches its greatest development in Jamaica, where *C. furfuracea* and *C. pubescens* reach a height of more than 40 feet. In Australia, Dicksonia may be 60 feet and Alsophila, the tallest of them all, may be 80 feet in height. Tree ferns rarely branch. Leaves of *Alsophila pruinata* measure from 16 to 18 feet in length.—*L. Pace.*

219. Fries, Thore C. E. **Experiment över Björkens Lövsprickning i Skogsgränser och i Dalbottnar. [Experiments on the foliation of birches in forest areas and in valley bottoms.]** Svensk. Bot. Tidskr. [Stockholm] 13: 43–47. 1919.—A phenological study of the relative conditions necessary for development of the leaf-buds of different species of birches in mountain localities as compared with valleys. The same species begin to develop at lower temperatures in the valleys than on the mountains and the author concludes that the trees to a large extent adjust themselves to the conditions under which they grow.—*W. W. Gilbert.*

220. Froggatt, W. W. **Ants and flowers.** Australian Nat. 4: 88. 1919.—Note only. Native bees visit flowers of *Capparis mitchelli* at night because mound ants prevent access by day.—*T. C. Frye.*

221. Frödin, John. **Några ord med anledning af Aug. Heintzes uttalanden om Potentilla multifidas spridningsbiologi [A few words on Aug. Heintze's remarks concerning the distribution biology of Potentilla multifida.]** [In Swedish.] Bot. Notiser **1919**: 137–138. 1919.—The author takes exception to Heintze's suggestion that this species may have been carried from Scandinavia to the alps by means of the reindeer-raven, in a manner similar to *Draba nemorosa* and *Potentilla argentea.* In order to support such a theory it would be necessary to prove: (1) that the seeds of this species would not lose their power of germination in passing through the intestines of such animals; (2) that there is any evidence of migration by these animals between the northern mountains and the southern.—*P. A. Rydberg.*

222. Fuller, George D. **Ecological anatomy of leaves.** [Rev. of: Hanson, Herbert C. **Leaf structure as related to environment.** Amer. Jour. Bot. 4: 533–560. *21 fig.* 1917. (See also Bot. Absts. 4, Entry 233.)] Bot. Gaz. 65: 487–488. 1918.—See Bot. Absts. 1, Entry 1326.

223. Garside, S. **Pollen presentation in Cryptostemma calendulaceum. R. Br.** Ann. Bolus Herb. 2: 149–152. *1 pl.* June, 1918.—The elongation of the style of this composite is very rapid, the process being completed in five minutes under favorable conditions. The extended style is sensitive to contact stimulus, and when the inflorescence is visited by a bee, all the styles that receive blows bend toward the insect, whereupon the pollen is effectively removed.—*H. C. Cowles.*

224. Hamilton, A. G. **The effect of sunlight on plants.** Australian Nat. 4: 89–90. 1919. Some of the effects given in the form of a summary.—*T. C. Frye.*

225. Hamilton, A. G. **Pollination of some Australian plants.** Australian Nat. 4: 75–81. 1919.—Adaptations to cross pollination in the flowers of some Australian plants.—*T. C. Frye.*

226. Harvey, R. B. **Importance of epidermal coverings.** Bot. Gaz. 67: 441–444. *2 fig.* May, 1919.—Undercooling of the tissues occurs to a greater degree in such herbaceous plants as possess protective epidermal coverings than in plants not so protected. The undercooling in such plants is not due to substances in the cell sap, but mainly to the prevention of inoculation from ice formed on the surface of the tissue. A method is given for determining electrically the temperatures within leaf tissues.—*R. B. Harvey.*

227. Hayden, Ada. **The ecologic foliar anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 69–85. *6 pl.* Feb., 1919.—Studies were made on the leaf anatomy of 28 species of prairie plants, 12 species being chosen from slopes and hill crests and 16 from alluvial basins. Prairie plants as a whole show a xerophytic tendency in leaf

structure, as indicated by specialized palisade tissue, water storage tissue, and a thick-walled epidermis, with or without trichomes. Xerophytism, however, is indicated not so much by these characters taken alone as by their correlation with other features, such as extensive root systems. Upland plants have a thinner epidermis than have lowland plants. 75 per cent of the upland species have trichomes, while 70 per cent of the lowland species are without them. 50 per cent of the lowland species have bifacial leaves, while but 33 per cent of the upland species possess them. Half of the upland species have centric to subcentric leaves, while only 12.5 per cent of the lowland species may be so classed. [See Bot. Absts. 2, Entry 978.]—*H. C. Cowles.*

228. Hayden, Ada. **The ecologic subterranean anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 87–105. *14 pl.* Mar., 1919.—Subterranean organs were studied in 26 species of prairie plants, 15 being upland species, and 11 species of alluvial basins. In the upland species there is a tendency to the production of prominent mechanical tissue; except in a few cases (as in *Spartina Michauxiana* and *Panicum virgatum*) mechanical tissues are moderate or lacking in the lowland species. In general parenchymatous tissue is reduced in the upland species and prominent in the lowland species, aerenchyma being present in the swamp plants. Vascular tissue appears to vary more taxonomically than ecologically. Subterranean stems tend to predominate in moist lowlands as an equivalent of primary roots and are more efficient than roots in propagation. The stem pith serves as a water reservoir. [See Bot. Absts. 2, Entry 745.]—*H. C. Cowles.*

229. Heintze, Aug. **Till kännedomen om Potentilla multifidas spridningsbiologi. [The distribution biology of Potentilla multifida]** (Swedish). Bot. Notiser **1918**: 302–206. 1918.—Records of occurrence of this species are given from Graubünden and the East Alps. In the Alps it is evidently distributed by sheep, chamois, and other animals. It was probably carried to the Alps by reindeer-raven. In an appendix, the author enumerates several other species, which spread from seeds passed through the intestines of animals.—*P. A. Rydberg.*

230. Heintze, Aug. **Om endo- och synzoisk fröspridning genom europeiska kråkfoglar [Endo- and syn-zoic dispersal of seeds by European Corvidae].** (Swedish.) Bot. Notiser **1917**: 209–240. 297–300; **1918**: 1–47. 1918.—The studies include the following birds: *Pica pica, Corvus cornix, C. corone, C. frugilegus, Coloeus monedula, Corvus corax, Pyrrhocorax pyrrhocorax, P. graculus, Cractes infaustus, Nussifraga caryocactes,* and *Garrulus glandarius.* Nearly all of these distribute plants which bear berries or stone-fruits. The seeds or stones of these are not at all or only partly damaged in the crop. All the larger, most of the middlesized, and half of the smaller seeds or fruits are dispersed in a hemi-endozoic way, i.e., they are regurgitated in the balls of castings, mostly in the evening after the birds have gone to rest; the rest pass through the intestines. *Nussifraga* usually breaks the stone before swallowing both the seeds and the fragments of the shells. *Garrulus* only occasionally makes castings and is of less importance in endozoic distribution. Both of these are important, however, in the distribution of larger nuts, as those of the oak, beech, hazel, walnut, chestnut, and piñon, which they bury like squirrels for winter food. The species of *Corvidae* also eat excrements of mammals, and are themselves eaten by owls, hawks, martens, etc., and thus constitute links in chains of dispersal, whereby seeds are carried long distances. They also eat young birds and rodents, and carrion, and disperse seeds in the same way as the birds of prey. Most of them are more or less migratory and therefore often carry the seeds long distances. The author enumerates 151 species of plants which he has found distributed by different species of *Corvidae.* The list of reference literature numbers 139 titles.—*P. A. Rydberg.*

231. Hendrickson, A. H. **The common honey bee as an agent in prune pollination.** California Agric. Exp. Sta. Bull. 291: 215–236. *13 fig.* Jan., 1918.—See Bot. Absts. 2, Entry 726.

232. Hesselman, Henrik. **Iakttagelser över Skogsträdspollens Spridningsförmåga. [Dissemination of pollen from forest trees.]** Meddel. Statens Skogsförsöksanst. 16: 27–60. *Fig. 1–3.* 1919.—The author studied the pollen dissemination of forest trees by placing petri

dishes containing glycerine-soaked filter papers on board 2 light-ships stationed 3 and 5.5 miles from the shore in the Gulf of Bothnia, Sweden. From May 16 to June 26, 1918, the total number of grains collected on a square millimeter of surface was 16.2 at 3 miles and 8.8 at 5.5 miles. Spruce (*Picea excelsa*) and birch (*Betula spp.*) were almost equally represented, with considerably less of pine (*Pinus sylvestris*), and very few of all other species. Other investigations and observations are cited to show that pollen grains may be carried by wind as much as 70 to 90 miles. This factor tends to counteract the development of local climatic forms or races of trees. It operates most effectively in the case of species such as the spruce which commonly open the pistillate flowers in advance of the staminate, and least effectively in species such as the pine in which this relation is reversed. This factor is suggested as accounting for the greater prevalence of "climatic races" in pine than in spruce. It is also pointed out that in plant breeding experiments it is of great importance to determine whether the individuals from which seed is collected blossomed earlier or later than their associates. Another field which is touched upon is that of paleobotany, in so far as the fossil flora of a region is determined by the occurrence of pollen grains, it being pointed out that the presence of fossil pollen grains of a given species is by no means certain evidence that the species occurred in the immediate locality, since the pollen grains may have been carried from a remote region. [See also Bot. Absts. 4, Entry 253.]—*G. A. Pearson.*

233. Hodson, Elmer R. [Rev. of Hanson, Herbert C., **Leaf structure as related to environment.** Amer. Jour. Bot. 4: 533–560. 1917.] Jour. Forestry 17: 186–188. 1919.—Work differs from usual methods in that the environmental factors were measured. Leaves of the interior of the crown were compared with those in the periphery on the south side and those on the outside had much thicker leaves than those on the inside, the difference being greater than the differences between mesophytic and xerophytic leaves. Evaporation was from 1.5 to 2.3 times as great an the periphery as in the crown, humidity was from 1 to 6 per cent higher in the crown, while the temperature was from to one two degrees lower in the crown than in the periphery. Leaves on the outside of the crown lose more water per unit area than center leaves, while they were in general smaller, deeper lobed and had a lower water content. [See Bot. Absts. 1, Entries 1326, 1328.]—*E. N. Munns.*

234. Howe, Inez Addie. **November flowers in northern Vermont.** Rhodora 21: 170. 1919.—A list of 44 species of plants which were found flowering in the neighborhood of the Fairbanks Museum at St. Johnsbury, Vermont, and were exhibited on the flower table at the museum between the first and the twenty-second of November. These were all cases of either second or continuous blooming resulting from the unusually wet, mild weather of October and November 1918.—*James P. Poole.*

235. Hutchinson, J. **The rain tree of Hierro, Canary Islands [Oreodaphne foetens].** Kew Bull. Misc. Inf. [London] 1919: 153–164. *3 fig.* 1919.—The peculiar features of this tree were known to the Romans who considered this island to be the western boundary of the world. This tree, like other species of Lauraceae, is shown to be an important agent in the condensation of moisture from the clouds. It is suggested that the judicious planting of such trees might so far increase the soil moisture as to make possible a considerable extension of banana culture in the Canaries. A critical and historical study is given of the efficiency of this tree in the condensation of water.—*E. M. Wilcox.*

236. Jekyll, Gertrude. **Pollination of Viscum album.** Jour. Botany 57: 286. 1919.—A brief record is given of an experiment in pollinating this plant. It is claimed that the presence of fertilized fruit inside of the mesh inclosure supports the results of experiments by Dom Ethelbert Horne which seemed to show fertilization is not necessarily due to bees and flies, as was claimed by Koelreuter, Kirschner and Loew.—*K. M. Wiegand.*

237. King, C. M., G. J. Ringland, and Hemenway Martha. **Blooming time of Iowa plants 1918.**—Rept. Iowa State Hortic. Soc. 53: 226–231. 1918.—Paper gives the blooming time of the common plants of Iowa at three different places; Ames, Boone and Lansing, with additional notes on the blooming of a few plants at Davenport and Council Bluffs, Kansas City, Missouri, and Manhattan, Kansas; also weather notes.—*L. H. Pammel.*

238. Knoll, Fritz. **Gibt es eine Farbendressur der Insecten? [Are insects trained in the recognition of colors?]** Naturwissenschaften 7: 425–430. 1919.—The question of the uniform attraction of certain colors for the honey bee and a few other insects is discussed. The paper contains many field observations on the color of the flowers visited by the insects. By certain procedures the attraction of the insects by means of chemical substances (odors, honey, etc.) is excluded. The insects worked with seem to be color-blind to reds and greens but in no case are they entirely color-blind.—*Orton L. Clark.*

239. Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p. 22 fig.* 1918.—See Bot. Absts. 1, Entry 1402; 3, Entry 1487.

240. Lohr, P. J. **Untersuchungen über die Blattanatomie von Alpen- und Ebenen-pflanzen. [Investigations on the leaf anatomy of alpine and lowland plants.]** Recueil Trav. Bot. Neerland. 16: 1–62. *Fig. 1a–4b* (8). *Tab. 12.* 1919.—The author investigates the leaf structure in a large number of alpine plants and those of ordinary level in Switzerland (168 species in 98 genera). The tissue volume is measured by micrometer, and an average of at least three specimens considered as standard. The injection method of Unger with modifications is used for the determination of the intercellular volume, which is found hydrostatically. A special method is used for small leaves as in *Empetrum nigrum.* From six to fifty leaves of every specimen are taken for determination and margins of error estimated. The leaf characters studied are: (1) thickness, (a) influence of exposure to light, (b) altitude under same exposure, (c) soil under same conditions; (2) epidermal structure, (a) thickness of cuticle, (b) thickness of epidermis, (c) distribution of stomata; (3) mesophyll structure, (a) influence of exposure on relative volume of palisade and aeration tissues, (b) influence of moisture in formation of same, (c) isolateral and dorsiventral leaves; (4) intercellular volume, (a) influence of exposure, (b) altitude, (c) soil moisture, (d) nature of substratum; (5) weight of dried and live leaves. The author concludes that there is no characteristic leaf structure for all alpine plants, since they are too much affected by location and other things that also determine the structure of lowland plants under similar conditions. A greatly developed cuticle is the only character that seems to be a mark of alpine plants. Thickness of leaf in sun plants is emphasized in alpine conditions, shade leaves being relatively thinner.—*J. A. Nieuwland.*

241. Long, Frances Louise. **The quantitative determination of photosynthetic activity in plants.** Physiol. Res. 2: 277–300. June, 1919. [Serial no. 16.]—Influence of light intensity, submergence under water, infection by parasites, etc., on net photosynthetic activity of leaves. [See Bot. Absts. 3, Entries 1375, 1452, 2685, 2833.]—*B. E. Livingston.*

242. Lumsden, D. **Orchid breeding.** Jour. Internat. Gard. Club 2: 203–212. *5 fig.* 1918.—A genetical paper with remarks on symbiosis in orchids. Root fungi are regarded as necessary for the successful growth of orchids, especially in the seedling stage. The relationship is regarded as one of mutual parasitism. A separate organism is required for each tribe, and often for each genus and species. [See Bot. Absts. 2, Entry 950.]—*O. E. White.*

243. Lundegårdh, Henrik. **Ekologiska och fysiologiska studier på Hallands Väderö. II. Till kännedom om strandväxternas fysiologi och anatomi. [Ecological and physiological studies on Hallands Väderö, Physiology and anatomy of the shore plants.]** (Swedish, with English summary.) Bot. Notiser 1919: 1–39. 1919.—In 1917 an ecological station and a physiological laboratory were established on Hallands Väderö, a small island in the Kattegat, off the west coast of Sweden. In part I (Bot. Notiser 1918; see Bot. Absts. 4, Entry 292) a vegetation analysis was made after the Raunkiaer method, and comparison made with other localities. The osmotic pressure of the leaf cells was determined for most of the halophytes, and the mesophyll was found generally to have a greater pressure than the epidermis. A low pressure was found in the succulents, *Sedum maximum* and *Suaeda maritima.* A moderate pressure was found in the halophytic and somewhat succulent *Cochlearia officinalis*,

Crambe maritima, and *Honckenya peploides*, possibly because they occur well up on the beach where the salt percentage is low. Higher pressures were found in *Spergularia salina*, *Scirpus maritimus*, and *Armeria elongata*. The highest pressure was found in *Atriplex latifolium*, which explains the presence of this species down to the littoral zone. The permeability of several halophytes for NaCl and other salts was determined by the Fitting method, and was found to be so slight as scarcely to be measurable; this slight permeability may be regarded as a high tide adjustment, preventing plants from taking up too much salt. The power of keeping down salt accumulation also may determine how far down toward the sea a plant may extend its habitat. The transpiration of halophytes was found uniformly to be less than that of mesophytes. Sun and shade forms of *Sedum maximum* and *Solanum dulcamara* have about the same osmotic pressure. *Atriplex latifolium* has two forms, a pale yellowish green littoral form, and a deep green supra-littoral form; the latter has twice as many stomata as the former, and the transpiration is proportionally greater.—*H. C. Cowles.*

244. MacDougal, D. T., H. M. Richards, and H. A. Spoehr. **Basis of succulence in plants.** Bot. Gaz. 67: 405–416. May, 1919.—A *Castilleja* native to the region about Carmel, California, includes two habitat forms, genetically identical, a thin-leaved forest form and a fleshy-leaved shore form. The thin leaves show an acidity double that of the fleshy type, and have a greater dry weight. The fleshy leaves present swelling reactions similar to those of sections of *Opuntia*, indicative of cells high in pentosans or mucilages. The thin leaves swell more in acid than in alkaline solutions. Differences in the swelling reactions of dried leaves of both kinds are to be ascribed to the adsorption of the contained acids and salts of different amounts in the two cases on cell colloids, high in pentosans in one case and hence presenting characteristic coagulatory effects. The reduction of the water content of the cell below a certain point results in the conversion of polysaccharides, which do not show a high inhibition capacity, to pentosans, which mixed with nitrogenous substances have an enormous hydration capacity. Succulence, therefore, may be a direct result of aridity. High acidity, contrary to general impression, may not be taken as a result of succulence. It is more probable that succulence may develop only in plants which have a carbohydrate metabolism characterized by large acid residues.—*H. C. Cowles.*

245. Magrou, J. **L'immunité dans la symbiose. [Immunity in symbiosis.]** Ann. Inst. Pasteur 32: 37–47. *Pl.* 1918.—See Bot. Absts. 2, Entry 193.

246. McAtee, W. L. **Summary of notes on winter blooming at Washington, D. C.** Proc. Washington [D. C.] Biol. Soc. 32: 129–132. 1919.—Due to the mild winter of 1918–19 unusual flowering phenomena occurred in the neighborhood of Washington, D. C. The author divides these phenomena into four groups, viz.: Autumnal flowering, late flowering, early flowering, and casual flowering. Lists are given of the plants in which such phenomena were found.—*J. C. Gilman.*

247. McDougall, W. B. **The classification of symbiotic phenomena.** Plant World 21: 250–256. Oct., 1918.—Symbiosis is defined as the living together of dissimilar organisms, and symbiotic phenomena classified as disjunctive or conjunctive. Each of these two main divisions is subdivided into social and nutritive. And nutritive symbiosis, whether disjunctive or conjunctive, is further classified as antagonistic or reciprocal. Examples are cited.—*Chas. A. Shull.*

248. Miehe, Hugo. **Anatomische Untersuchung der Pilzsymbiose bei Casuarina equisetifolia nebst einigen Bemerkungen über das Mykorhizenproblem. [Anatomical studies on fungal symbiosis in Casuarina equisetifolia with some remarks on the mycorhiza problem.]** Flora 11–12: 431–449. *1 pl., 2 fig.* 1918.—The roots of *Casuarina equisetifolia*, growing on coral islands near Java, bear structures very similar to the root tubercles of the alder. These tubercles were found to consist of closely compacted masses of numerous, freely-branching, shortened rootlets, certain of the cortical cells of which contain the hyphae of a fungus. The author designates these tubercles "Rhizothamnien," and ascribes their formation to the in-

fluence of the invading fungus. The morphology of the infected host tissues and also that of the invading mycelium is presented in considerable detail. Microchemical studies showed that the walls of the invaded host cells become lignified as a specific reaction to the infection. These "Rhizothamnien" occur on all roots of *Casuarina equisetifolia* growing on its native habitat, but they were entirely absent from plants grown under greenhouse conditions in the botanical garden at Leipzig. The author compares the inter-relation of fungus and host in this particular instance with other mycorhizal relationships which have received careful study. He believes this to be a case of typical symbiosis in which the fungus may be of use to the host plant in working over nitrogenous materials derived from the humus of the soil into such forms as can be used directly in the metabolism of the plant.—*P. D. Strausbaugh.*

249. Nakajima, Yôzô. **Midzu-ohbako no kwajitsu no hôkwai genshô ni tsuite. Ueber das Verbreitungsmittel der Samen von Ottelia alismoides Pers. [On the method of seed dissemination of Ottelia alismoides Pers.]** [Title in Japanese and German, text in Japanese.] Bot. Mag. Tokyo **33**: 44–52. Mar., 1918.—The fruit of *Ottelia alismoides* discharges its seeds after it has floated up to the water surface or while rising to the surface. Dissemination takes place by means of a special disintegration of the fruit shell, in which the component cells become dispersed in the water. This disintegration can be hindered or stopped if the tissue is placed in a 20 per cent aqueous cane-sugar solution or in a 2 per cent KOH solution. It is concluded that this effect may be due to the lowering of turgor in the cells of the fruit tissue. —*K. Morita.*

250. Narasimhan, M. J. **A preliminary study of root-nodules of Casuarina.** Indian Forester **44**: 265–268. June, 1918.—See Bot. Absts. 1, Entry 1454; 3, Entry 111.

251. Neger, F. W. **Die Wegsamkeit der Laubblätter für Gaze. [Gas passage-ways in leaves.]** Flora **11–12**: 152–161. 1918.—A comparison of different leaf types as to their aeration systems, and the degree of connection between intercellular spaces.—See Bot. Absts. 2, Entry 619.—*H. C. Cowles.*

252. Nelson, J. C. **Flowers of varying color.** Amer. Bot. **25**: 96–99. 1919.—Forty-nine flowers that have different color forms, 43 that have two or more colors in their blossoms, and 8 that change color in blooming are listed.—*W. N. Clute.*

253. [Nordstedt, C. F. O.] [Swedish rev. of: Hesselman, H. **Iakttagelser över skogsträdspollens spridningsförmåga. (Observations on the dispersal capacity of forest tree pollen.)** Meddel. Statens Skogsförsöksanstalt **16**: 27–60. *3 fig.* 1919. See Bot. Absts. 4, Entry 232.] Bot. Notiser **1919**: 167–168. 1919.

254. [Nordstedt, C. T. O.] [Swedish rev. of: Resvoll, T. R. **Om planter som passar till kort og kold sommer,** *224 p.* No date on citation given. **Regarding plants which are fit for a short and cold summer].** Bot. Notiser **1918**: 139–140. 1918.—*P. A. Rydberg.*

255. Osterhout, W. J. V. **Endurance of extreme conditions and its relation to the theory of adaptation.** Amer. Jour. Bot. **5**: 507–510. *Fig. 1.* Dec., 1918.—A species of *Tradescantia* (*T. fluminensis?*) is found to resist equally extremes of drought and of moisture. Pieces of this plant lying on the laboratory table, deprived of soil and all sources of moisture supply except the air continued to live and grow for nearly two years. They lost from 10.5 to 95 per cent in weight but increased as much as 150 per cent in length. Subsequently these same pieces planted in soil in a saturated atmosphere grew vigorously and normally. Even when submerged in running water, some of them remained alive and grew slightly for the period of one month when the experiment was discontinued. The author believes that "the explanation of such cases must be sought in physical or chemical conditions of the protoplasm which arise without reference to direct adaptaton" and "that many cases now regarded as adaptation may prove to be fictitious." [See Bot. Absts. 2, Entry 1128.]—*P. D. Strausbaugh.*

256. Pearson, G. A. **The relation between spring precipitation and height growth of western yellow pine saplings in Arizona.** Jour. Forestry **16**: 677–689. *3 fig.* 1918.—See Bot. Absts. 2, Entries 382, 552.

257. Pethybridge, George H. **Heterocarpy in Picris echioides.** Irish Nat. **28**: 25–32. *Pl. 3.* 1919.—An unknown seed which occurred as an impurity in lucerne seed proved on germination to be *Picris echioides.* This new seed is described as looking like a "peeled banana" and differs from the usual type. Later studies showed that the flower head had on the average 67 ligulate flowers; three or four of these situated next the bracts, differed slightly from the others and those produced the peculiar fruit. These two types are referred to as disc and ray florets. The seeds from the ray florets are gripped by the bracts and remain attached to the head after the other seeds have been dispersed by the wind. The suggestion is made that the whole head may be carried by animals and hence the plant has two methods of seed dispersal. No difference was observable between the plants raised from the two types of seed.—*W. E. Praeger.*

258. Pulling, Howard E. **Root habit and plant distribution in the far north.** Plant World **21**: 223–233. *1 fig.* Sept., 1918.—Describes the root habits of some northern trees. The roots of *Picea mariana, Larix americana,* and *Betula papyrifera* have a rigid shallow root habit, *Picea canadensis* a flexible shallow habit. *Populus balsamifera* is deep rooted and flexible, and *Pinus banksiana* and *Pinus strobus* have a deep rigid root habit. The degree of flexibility and degree of penetration in deep soils may be a determining factor in the northward distribution of many plants regardless of environmental influences which may exclude other species from those regions. [See Bot. Absts. 2, Entry 288; also rev. by Korstian in Jour. Forestry **17**: 327–328.]—*Chas. A. Shull.*

259. Rendle, A. B. **Some cases of adaptation among plants.** Jour. Quekett Microsc. Club **14**: 23–28. 1919.—Address of president. Primary and secondary adaptations are described in *Drosera,* orchids, and grasses. It is noted also that there are many forms and structures whose evolution we are quite unable thus far to relate to environment.—*H. C. Cowles.*

260. Rigg, George B. **Growth of trees in sphagnum.** Bot. Gaz. **65**: 359–362, Apr., 1918.—Data from the Puget Sound region and Alaska show that trees grow very slowly in *sphagnum.* The western hemlock (*Tsuga heterophylla*) is the commonest tree in *sphagnum* in the Puget Sound region, and shows less growth retardation than any other species observed. In Alaska bogs conifers growing in *Sphagnum* are much distorted and frequently are prostrate, while in the bogs about Puget Sound, trees growing in *sphagnum* are erect though reduced in size. [See Bot. Absts. 1, Entry 193.]—*H. C. Cowles.*

261. Sedgwick, L. J. **Analyses of some morphological characters of Bombay woody species from an ecological standpoint.** Indian Forester **45**: 193–199. 1919.—An analysis of the woody species of Bombay as to leaf-apex armature and seed dispersal shows that there is a definite relation between the forms and the environment.

	Apices				Armature		
	Number of species	Acute	Sub-obtuse	Obtuse	Number of species	Unarmed	Armed
Evergreen	393	324	41	28	400	362	38
Deciduous	130	82	14	34	136	114	25
Xerophytic	94	33	13	39	108	69	39
Maritime	28	11	4	13	28	28	

It is believed that these tendencies are the result of development due to environment.—*E. N. Munns.*

262. Sharples, A. **The laticiferous system of Hevea brasiliensis and its protective function.** Ann. Botany 32: 247–257. 1918.—See Bot. Absts. 1, Entry 1409.

263. Shreve, Forrest. **The Jamaican filmy ferns.** Amer. Fern. Jour. 3: 65–71. Sept., 1918.—Though forty-nine species of filmy ferns have been reported for Jamaica, the author was able to find but thirty-three; eighteen of *Trichomanes* and fifteen of *Hymenophyllum*. These filmy ferns show a considerable diversity of habit, structure, and habitat which does not seem to be true of those from Ceylon and Java. An abundant supply of surface moisture is necessary because of the delicate structure of the fronds which are but one cell thick and have no epidermis, stomata or intercellular spaces. They occur on the deeply shaded floor of the lowland forests; at higher elevations, where the moisture is more abundant, they grow as climbers or epiphytes above the forest floor. Brief descriptions are given of some of the main types, and attention is directed to two special adaptive features; (1) in some of the more segmented forms a hairy coat is developed which aids in the retention of moisture, thus preventing extreme desiccation; (2) some of the epiphytic forms growing well above the forest floor where the air is relatively dry have undergone a physiological adaptation by reason of which the cells are enabled to lose a great amount of water for a short period without serious results.—*P. D. Strausbaugh.*

264. Small, James. **The origin and development of the Compositae. Chapter IX. Fruit dispersal.** New Phytol. 17: 200–230. *4 fig.* Nov., 1918. Experiments with a special apparatus on the fruits of *Taraxacum* and other composites definitely prove the efficiency of pappus in wind dispersal over wide areas. Discrepancies with observers who have minimized the efficiency of pappus are explained by assuming that the problem is one of hydrodynamics, instead of hydrostatics, as it has been commonly regarded. A pappose fruit is more comparable to an aeroplane or kite than to a parachute or balloon. It is concluded that with a relative humidity not exceeding 0.77, a horizontal wind with a velocity of 1.97 miles per hour can transport a *Taraxacum* fruit any distance; when the air becomes moist, the pappus closes up and the fruit falls to the ground. A pappose composite fruit under proper meteorological conditions can be blown many hundreds of miles, thus doing away with the necessity of postulating land bridges, in order to account for the presence of the Compositae on oceanic islands. This is an important point, because this family is almost certainly of recent origin. [See also Bot. Absts. 2, Entry 75.]—*H. C. Cowles.*

265. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–77. Jan., 1919.—An attempt to ascertain whether the structure of the urediniospores of biologic forms of *Puccinia graminis* changes readily in response to environmental conditions. It is concluded that these biologic forms are as constant morphologically as they are parasitically, and that the morphologic differences between them are as considerable and as distinct as between many established species of fungi. The morphologic stability of a biologic form is exhibited in the constancy of size, shape, and color of the urediniospores; oat stem-rust (*Puccinia graminis avenae*) is an exception in that the urediniospores are very plastic in respect to shape and size. [See Bot. Absts. 2, Entry 1081. Also abst. in Exp. Sta. Rec. 40; 641–642. 1919.]—*H. C. Cowles.*

266. Stevens, O. A. **The panurgine bees of North Dakota and a new Epeolus.** Canadian Entomologist 51: 205–210. 1919.—A list of the flower visiting bees, together with the names of the plants at whose flowers they were found. The locality and dates given for the collection of the bees give also an index to the flora and the time of blooming of the species cited. *Petalostemon villosum* is reported to occur only near Sheldon, whereas *P. oligophyllum* and *P. purpureum* are common throughout the state.—*Wanda Weniger.*

267. Tischler, G. **Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei Lythrum Salicaria mit Beziehung auf das "Illegitimitätsproblem." [Studies on the anatomical structure of the stamens and pistils of Lythrum Salicaria with relation to the**

problem of "illegitimacy."] Flora 11-12: 162-193. *1 pl. 8 fig.* 1918.—The pollen of the small and middle-sized stamens is stunted. The stamens themselves may be regarded, not as adaptations, but as structures whose growth is stunted through insufficient access to water and foodstuffs, the vascular bundles being notably reduced in comparison with those of the long stamens. The stigma papillae, however, are much the same in the pistils of different lengths, though it has generally been thought otherwise. The phenomena of stunted growth in heterostyled flowers has much in common with stunting in cleistogamous flowers, though in the one case it favors cross pollination, and in the other, close pollination. Thus there is not an adaptaton of pollen grains to particular stigmas. Self-sterility would seem to rest on factors of chemical nature. See also rev. by Renner in Zeitschr. Bot. 10: 767-768. 1918. —*H. C. Cowles.*

268. Turchini, Jean. **Rôle de l'hétérocyste des Nostocées.** [**Rôle of the heterocyst of the Nostocaceae**]. Rev. Gén. Bot. 30: 273-282. *Pl. 19.* 1918.—See Bot. Absts. 1, Entry 1321.

269. Tureson, Göte. **Om långvaga växttranport genomfoglar.** [**Distant transportation of plants by means of birds.**] [Swedish.] Bot. Notiser 1918: 248. 1918.—As examples of plants transported long distances by birds are given *Carex festiva* and *Fragaria chilensis*, carried from Alaska to the Sandwich Islands. A similar case is noted in the hepatic *Lepidozia sandvicensis*, found in the same two territories. It is uncertain to which of the two it is really indigenous.—*P. A. Rydberg.*

270. von Kirchner, O. **Die Bestaübungseinrichtung von Isnardia palustris L. und ihrer Verwandten.** [**The mechanism for pollination of Isnardia palustris L. and related genera.**] Flora 11-12: 317-326. *6 fig.* 1918.—During the summer of 1917, in the botanical gardens of Munich, the author made careful studies of floral structure and pollination in *Isnardia palustris*, and also in some species of the closely related genus *Ludwigia*. In the flowers of the former he finds complete absence of petals, abundant nectar secretion, and the occurrence of self-pollination which takes place cleistogamously before the opening of the calyx. From a comparison of these facts with those obtained from his studies of various species of *Ludwigia*, especially *Ludwigia repens*, the author concludes that the first step in the gradual development of cleistogamy proper in *Isnardia palustris* is regular autogamy, and the second, the degeneration of the corolla.—*P. D. Strausbaugh.*

271. Waterman, W. G. **Development of root systems under dune conditions.** Bot. Gaz. 68: 22-53. *17 fig.* July, 1919.—The study is made in the neighborhood of Crystal Lake, Benzie County, Michigan. After a presentation of the synecology of the region, the author notes that little study has been made of the extension of root systems, or of the reasons therefor. On account of its relative uniformity dune sand is regarded as particularly well-suited for such a study. Striking differences in root reactions are found in species of the same habitat, even in such a pioneer habitat as the foredune; for example *Ammophila* has great root extension in pure dune sand, whereas *Prunus pumila* has similar extension only where the roots come in contact with organic matter. Such reactions are specific and hereditary, and are of much importance in the determination of species for dune planting. Chemical influences are probably more important than moisture, oxygen, or soil penetrability in the causation of asymmetry in root development. The frequent lengthening and thickening of roots at the expense of shoots, where the roots come into favorable relation with organic matter, calls into question the value of the common method of estimating plant growth by measuring the length and weight of roots.—*H. C. Cowles.*

272. Weaver, J. E. **The quadrat method of teaching ecology.** Plant World 21: 267-283. *Fig. 1-7.* 1918.—See Bot. Absts. 4, Entry 165.

273. Yoshii, Y. [Rev. of: Hayden, Ada. **The ecologic subterranean anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 87-105. *14 pl.* 1919. (See Bot. Absts. 2, Entry 745; 4, Entry 227.)] Bot. Mag. Tokyo 33: 111-112. 1919.

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274. Armitage, Eleanora. **On the habitats and frequencies of some Madeira bryophytes.** Jour. Ecol. **6**: 220–225. 1918.—A brief account of the bryophyte communities at various elevations on the southern side of the island of Madeira. About 170 species are listed as characteristic of various habitats.—*G. E. Nichols.*

275. Arrhenius, Olof. **Försök till en ny metod för analys av växtsamhällen. [Experiments relating to a new method of analyzing plant associations.]** Svensk. Bot. Tidskr. [Stockholm] **13**: 1–20. 1919.—The author describes and illustrates a method which he has worked out for quickly analyzing plant associations. He has used it in about one hundred cases with good results, though he considers it still in the experimental stage. Its chief value is its ready adaptability to field use.—*W. W. Gilbert.*

276. Beauverd, Gustave. **Excursions phytogéographiques aux environs de Viège et Zermatt (Valais). [Phytogeographic excursions to the vicinity of Viège and Zermatt (Switzerland).]** Bull. Soc. Bot. Genève **10**: 259–284. 1918.—A comparative study of the spring subalpine flora in the vicinity of Zermatt leads to an ecological classification in which the flora may be considered as represented by three phases. The first flowering plants to dominate the artificial prairies are: *Trollius europaeus*, *Melandrium roseum*, *Geranium silvaticum*, and *Narcissus poeticus* which was possibly introduced. In the scrub, *Juniperus sabina* is accompanied by different species of *Artemisia, Achillea, Astragalus* and *Oxytropis*. *Juniperus commune*, *Prunus mahaleb*, and *Berberis vulgaris* are generally frequent. The lower forests consist mainly of pine, spruce, birch and larch with *Crataegus*, a little *Quercus* and *Acer campestre*. *Pinus montana*, *Betula pubescens*, *Picea excelsa*, and *Larix decidua* make up the middle forests fringed with *Pinus cembra*, *Alnus viridis*, and sometimes different species of *Salix*. With the disappearance of *Pinus montana* and *Picea excelsa* the upper forests are characterizied by a pure formations of firs.—*W. H. Emig.*

277. Bews, J. W. **The grasses and grasslands of South Africa.** *VI + 161 p. 24 fig.* P. Davis & Sons, Ltd.: Pietermaritzburg, 1918.—See Bot. Absts. 2, Entry 7; 3, Entry 1287. Also Nature **103**: 62. Rev. by Fuller in Bot. Gaz. **67**: 370, and by W. G. Smith in Jour. Ecol. **7**: 84–87.

278. Bouget, Joseph. **De l'influence des neiges sur la répartition des différents végétaux a même altitude dans les zones élevées des Pyrénées. [The influence of snow on the distribution of different plants at the same altitude in the elevated zones of the Pyrenees.]** Rev. Gén. Bot. **30**: 305–320. Oct., 1918. The author discusses some facts concerning plant distribution on the north slope of the central Pyrenees, on the basis of observations made during a period of twenty-five years. Three levels are chosen in order to facilitate presentation: one at 1900, a second at 2500, and a third at 2800 meters. Lists of the plants found in places of more marked relief, and those growing in depressions at these respective altitudes are given. An attempt is made to account for this grouping of the vegetation, each group presenting its own peculiar floral composition. Reference is also made to the practical application of the facts observed in the problem of reforestation. Conclusions are as follows: "(1) the distribution of plants in the elevated places of the mountains is strongly influenced by the relief of the surface and by the length of time it is covered with snow. At a given altitude, with a given exposure, and upon soil of the same nature, the vegetation is xerophilous upon the ridges with some woody and herbaceous plants; while it is essentially hygrophilous in the low places with plants exclusively herbaceous. Between these extreme cases there exists an intermediate vegetation the nature of which is in direct accord with the contour of the land. (2) The exclusively herbaceous flora of the depressions where the snow remains for a long time is composed of a curious mixture of alpine and lowland plants, all however hydrophilous. (3) The upper limits of the forests are directly determined by these influences, that is by the relief of the soil. The trees always occur at a higher altitude on the ridges than in the low places. *Abies pectinata*, for example, never ascends above 1800 meters except upon the

ridges. The limit of the continuous forest for this species is then about 1800 meters, and not above. (4) As a practical consequence it is absolutely useless to attempt to reestablish the first forest above 1800 meters upon the north slope of the Pyrenees."—*P. D. Strausbaugh.*

279. Brenchley, W. E. **Buried weed seeds.** Jour. Agric. Sci. 9: 1–31. 1918.—A study of the viability of weed seeds, also showing that the weed flora of any given tract of land is closely associated with the recent history of that land; in other words, the origin of such weed seeds is largely local. [See Bot. Absts. 2, Entry 615.)—*H. C. Cowles.*

280. Burkill, I. H. **The composition of a piece of well-drained Singapore secondary jungle thirty years old.** Gardens' Bull. Straits Settlements 2: 145–157. 1919.—An area of about two acres was cleared in a secondary jungle in the "rain forest" of "Malaya." An attempt was made to determine the relative abundance of every species present; height and girth measurements were made of trees above thirty feet in height.—*S. F. Trelease.*

281. Coker, W. C. **A visit to Smith Island [North Carolina].** Jour. Elisha Mitchell Sci. Soc. 34: 150–153. *Pl. 10–16.* Sept., 1918.—Smith's Island is the southernmost point on the North Carolina coast, at the mouth of the Cape Fear River, and is the northernmost locality where *Sabal Palmetto* occurs in any abundance There are said to be several thousand individuals of this palm there, but a great many were killed by the extreme cold of the winter of 1917–18. The vegetation has a semi-tropical aspect, and the great majority of the trees are evergreen. The paper closes with notes on and two illustrations of *Dendrium buxifolium*, a rare Ericaceous shrub found on the mainland near by.—*Roland M. Harper.*

282. Farrow, E. Pickworth. **On the ecology of the vegetation of Breckland. VII. General effect of blowing sand upon the vegetation.** Jour. Ecol. 7: 55–64. *1 pl.* May, 1919.—Continuing the series aready noted (See Bot. Absts. 1, Entry 824) the author reports the details of the manner of sand movement upon a sandy heath, the development of miniature sand blasted cliffs and the unearthing of *Calluna* plants receiving special attention. In the revegetation of bare sand blasted areas *Polytrichum piliferum* was a common pioneer followed by *Cetraria aculeata*, *Cladonia coccifera* and *Ceratodon purpureus*. In an experimenta quadrat of bare sand *Rumex acetosella* was the chief pioneer soon accompanied by *Senecio vulgaris*, *Cladonia* spp., *Taraxacum erythrospermum* and *Galium saxatile*, the divergence in the experimental quadrat from the ordinary succession being ascribed to the fact that it was protected from rabbits. The reaction of plants to covering with drifted sand was also noted and *Agrostis vulgaris*, *Festuca ovina*, *F. rubra*, *Galium verum*, *Rumex acetosella*, *Thymus serpyllum* and *Lotus corniculatus* were found to be successful in surmounting superficial deposits of sand. —*Geo. D. Fuller.*

283. Fernald, M. L. **Lithological factors limiting the ranges of Pinus Banksiana and Thuja occidentalis.** Rhodora 21: 41–67. *1 fig.* Mar., 1919.—A criticism of a recent ecological paper by Hutchinson (Hutchinson, A. H. **Limiting factors in relation to specific ranges of tolerance of forest trees.** Bot. Gaz. 66: 465–493. *7 fig.* Dec., 1918. [See Bot. Absts. 4, Entry 190]), especially with regard to what the latter describes as the "anomalous" distribution of *Thuja occidentalis*, and the "irregularities" and "inconsistencies" in the distribution of *Pinus Banksiana*. The present author claims that *Pinus Banksiana* is calciphobous, being found on acid rocks and sands and sometimes in acid bogs. *Thuja occidentalis*, on the other hand, is calcicolous, being confined mainly to basic soils, all of its outlying stations being in positively calcareous areas. The presence of *Thuja* in cedar swamps is explained by regarding these habitats as rich in calcium and potassium and so comparable to the "low moors" of Europe. Rev. by Fuller in Bot. Gaz. 68: 149–150. 1919.—*James P. Poole.*

284. Foweraker, C. E. [Rev. of: Oliver, W. R. B. **The vegetation of Lord Howe Island.** Trans. New Zealand Inst. 49: 94–161. *7 pl.* 1916.] Jour. Ecol. 7: 106–108. 1919.

285. Frödin, John. **Om förhållandet mellan berggrundens kalk-halt och de nordswenska växternas utbredning [The relation between the lime content of the underlying rocks and the distribution on the North Swedish species of plants].** [Swedish.] Bot. Notiser **1919:** 139-147. 1919.—While it is true in general that certain plants prefer and are practically limited in distribution to localities with underlying calcareous rocks, in many places lime-loving plants occur in regions with underlying siliceous rocks. Especially in valleys calcareous stones and gravel derived from neighboring calcareous formations may overlie the siliceous bed rock. In places where the underlying rocks are calcareous, one may find lime-lovers poorly represented, because of masses of deposited siliceous sand and gravel. There is, therefore, need of being careful and of not placing too much importance on the underlying rocks, as the upper soil, gravel, or loose rocks may have a different content of lime.—*P. A. Rydberg.*

286. Fuller, Geo. D. **Units of vegetation and their classification.** Bot. Gaz. **66:** 385-388. 1918.—This paper embodies a critical review of some of the more recent articles making contributions to the classification and nomenclature of the units of vegetation recognized by ecologists. Moss is shown to have traced the early history of the subject, Gleason to have emphasized the individualistic concept in contending that all phenomena of vegetation depend upon the phenomena of the individual plant, while Clements has gone to the other extreme in regarding the plant community as an organism or at least as directly comparable to an organism. Clements has also elaborated a complex system of classification of plant communities. Nichols is shown to have regarded the association as the fundamental unit of vegetation and to have elaborated a logical classification based upon this unit. He has also added a useful but abstract concept in the *association-type* to represent "a type of plant association which is correlated with a given type of habitat." He is shown to have retained the well known classification of Schimper by modifying the concepts to include the developmental idea, and to have demonstrated the utility of his classification by applying it to the analysis of the vegetation of Cape Breton Island.—*Geo. D. Fuller.*

287. Ganong, W. F. **Nichols's vegetation of northern Cape Breton.** [Rev. of: Nichols, George E. **The vegetation of northern Cape Breton Island, Nova Scotia.** Trans. Conn. Acad. Arts and Sciences **22:** 249-467. 1918. See Bot. Absts. **1**, Entry 833.] Rhodora **21:** 171-172. 1919.—A review of Nichols's monograph.—*James P. Poole.*

288. Harvey, LeRoy H. **A coniferous sand dune in Cape Breton Island [Nova Scotia].** Bot. Gaz. **51:** 417-426. *8 fig.* May, 1919.—An account of the only dune formation found in this region. Three associations are described: (1) the middle beach; (2) the dune complex; and (3) the salt marsh. The characteristic plants of each of these associations are listed. In summarizing, the author states that "the purpose of the paper is to put on record several facts of ecological interest: (1) a coniferous sand dune with *Picea canadensis* as its facies located at the latitude of 47 degrees north; (2) *Poa compressa* as a sand binder; (3) abundant layering in *Picea canadensis* and *Abies balsamea*; (4) the anomalous condition of a sand dune moving seaward; (5) a phenomenal development of *Arceuthobium pusillum* on *Picea canadensis*; (6) the decisive value of ecological data in the interpretation of physiographic phenomena."—*P. D. Strausbaugh.*

289. Hepburn, Ivan P. **Ecological notes on the mountainous portions of the Herschel District [South Africa].** South African Jour. Nat. Hist. **1:** 210-223. 1919.—The mountains of the Herschel District reach a height of 9000 feet, and the higher strata consist of Drakensberg lavas and basalt. The Cave sandstone strata reach a height of between 600 and 7000 feet, and probably strata of blue and red shale occur between the Cave sandstones. At a lower level the red sandstone occurs. The annual rainfall varies from 23 to 40 inches. The winter is cold. The spring is usually windy and dry and the early summer is often dry; the late summer and autumn is the rainy season. There is no doubt that the influence of man has increased and is still increasing the aridity of the country. This is very evident on the mountains. The veld is mostly grassland but owing to overstocking, etc., the grass is in

many places being replaced by various shrubs. Succulents are very rare. In the mountain formation there is a great difference between the vegetation of sunny and of shady slopes Often on shady slopes bush and scrub occur. On the mountains there appear to be roughly four formations: (1) *Leucosidea sericea* in the kloofs. (2) The mesophytic *Arundinaria tesselata* formation, (3) The less mesophytic tussock grass formation, and (4) the xerophytic ericoid shrub formation.—*E. P. Phillips.*

290. Kirkconnel, T. W. **The flora of Kapuskasing [Ontario] and vicinity.** Canadian Field-Nat. 33: 33–35. 1919.—A brief description of vegetation under subarctic conditions, in a part of the so-called 'clay belt' of New Ontario.—*W. H. Emig.*

291. Kolkwitz, R. **Über die Standorte der Salzpflanzen.—II. Plantago maritima. [Concerning the distribution of halophytes. II. Plantago maritimo.]** Ber. Deutsch. Bot. Ges. 36: 636–645. *1 fig.* 1918. [Mar., 1919].—*Plantago maritima* was observed on soils containing chlorides, sulphates, carbonates and possibly silicates. In the places where it stands outside its normal associations it is derived from forms originally typical halophytes. However, the chief occurrence of *Plantago maritima* is in salt soil with typical salt plants.—*Ernst Artschwager.*

292. Lundegardh, Henrik. **Ekologiska och fysiologiska studier på Hallands Väderö. I. Vegetationens sammansättning [Ecological and physiological studies on Hallands Väderö (an island off the west coast of southern Sweden). I. Composition of the vegetation.]** [Swedish.] *Map.* Bot. Notiser 1918: 265–286. 1918.—The vegetation is divided between the shore-vegetation and the forest. The former is subdivided into the vegetation of the cliff-shores and of the sand-beaches, and the latter into the oak- and beech-woods and the alder-swamps. All except the woods proper show zonations depending upon the depth of the permanent moisture of ground-water, the percent of salt present, and the amount of light. Short descriptions of the vegetation of each zone are given, as well as that of the small islets surrounding Hallands Väderö. These islets have only a cliff-shore vegetation.—*P. A. Rydberg.*

293. MacIntire, W. H. **The growth of sheep sorrel in calcareous and dolomitic media.** Jour. Amer. Soc. Agron. 10: 29–31. *1 pl.* Jan., 1918.—It has generally been held that *Rumex acetosella* grows best in an acid soil; hence it has been used as an indicator of acid land. Since there is ample experimental evidence that this plant can thrive in calcareous media, it is probable that its general absence from such soils in nature is due to its relative impotence in competition. [See also Bot. Absts. 2, Entry 311.]—*H. C. Cowles.*

294. Morris, George. **Reconnaissance of the plant associations in the neighborhood of Newbury, Berkshire.** Jour. Ecol. 7: 65–70. *2 fig.* May, 1919.—Notes are given upon an area with varied substratum having a vegetation much disturbed by man's activities and including forests in which *Quercus robur*, *Fagus silvatica*, *Acer pseudo-platanus*, *Betula*, and *Pinus silvestris* are prominent elements. There are also areas of alderwood, *Alnus glutinosa*, and of heaths dominated by *Calluna* and *Ulex*. Some conclusions are drawn as to the probable primitive vegetation.—*Geo. D. Fuller.*

295. Naumann, Einar. **Bidrag till kännedomen on vegetationsfärgningar i sötvatten. VII. En komplettering till bidragen II, III och V. [Contribution to the knowledge of vegetable coloration in fresh water].** (Swedish, with German résumé.) Bot. Notiser 1918: 217–230, *fig. 1–4.* 1918.—The following plankton associations are described and illustrated: (1) *Golenkinia radiata*, (2) *Chrysococcus porifer*, (3) *Chlamydomonas* spp. and *Trachelomonas volvocina*, (4) *Chrysococcus*, *Trachelomonas*, *Euglena*, &c.—*P. A. Rydberg.*

296. Paulsen, Ove. **Plankton and other biological investigations in the sea around the Faeroes in 1913.** Meddelelser Fra Kommissionen For Havundersøgelser, Serie; Plankton. I. *27 p., fig. 6.* 1918.—An account of plankton investigations made in Trangisvaag fjord and on Faeroe Bank from May 15 to June 21 of the summer of 1913. The dominant species are listed and attention is given to the density of the plankton, composition and distribution.

The *Laminaria* forests are described, and a list of the diatom species collected is included. Examinations of the stomach content of the fish found in the fjord reveal that "the cod and coalfish both live on plankton organisms and bottom forms, as well as on animals living in the weed beds, with this difference, however, that the coalfish feeds to a greater extent than the cod on plankton, while gammarines appear to form the staple nourishment of the young cod.—*P. D. Strausbaugh.*

297. Pavillard, J. **Remarques sur la nomenclature phytogéographique. [Remarks on phytogeographic nomenclature.]** *27 p.* Roumégous et Déhan: Montpellier, July, 1919.—This article consists principally of a discussion of the application of the terms habitat (station) life-forms and association and of the proper content of the concepts associated with these terms. This discussion includes a criticism of the recent articles by Gams, Du Rietz and Braun-Blanquet on ecological terminology. To avoid confusion Pavillard suggests that "locality" should be used when a purely geographical meaning is intended and that "habitat" have an entirely ecological significance. He also insists upon the characterization of the association by its floristic composition but recognizes that there should be more than the mere enumeration of the species present. To provide this further analysis he approves of giving to each species a number indicative of its constancy in the association under consideration. This numerical evaluation has been termed a "coefficient of affiliation" (Gesellschaftstreue) by Braun-Blanquet. To this Pavillard adds another coefficient of similar numerical rank, that is ranging from 5 to 0, termed a "genetic coefficient" and based upon the importance of the species in the development and maintenance of the association. The combined value of these coefficients will tend to express with some accuracy the true value of each species of a community. Rev. by Fuller in Bot. Gaz. **69**: 184. 1920.—*Geo. D. Fuller.*

298. Phillips, Edwin Percy. **Some notes on a collecting trip to French Hoek.** South African Jour. Sci. **15**: 450–478. 1919.—French Hoek lies at an altitude of 836 feet and is surrounded by a chain of mountains roughly in the form of a horse shoe. Above 1500 feet is Table Mountain Sandstone which rests on the Malmesbury beds and the valley is covered with Recent deposits. The character of the vegetation changes as the mountains are ascended. The slopes are covered with bush and shrub, principally *Cliffortia ruscifolia* and *Passerina filiformis.* On the Sandstone the bush disappears and the summits are clothed with species of *Restiaceae.* The Table Sandstone carries a more varied flora than the Malmesbury beds, and each formation has some species restricted to it. The bulk of the species are either woody shrubs, bushes or trees; herbaceous plants, acaulescent plants, prostrate plants or scramblers and annuals are not so numerous. The bulk of the species have simple, glabrous leaves, and the xerophytic characters are mainly evidenced in the reduced leaf, involute or revolute leaf and leaves with thick cuticles. Over 60 per cent of the species produce conspicuous flowers, or flowers grouped into conspicuous masses. The color of the flowers is usually white or yellow. Dehiscent fruits predominate, then follow dry indehiscent fruits, while fleshy fruits are rare. There follows a list of 335 species collected, accompanied by field notes.—*E. P. Phillips.*

299. Phillips, Edwin Percy. **A note on the flora of the great Winterhoek Range [South Africa].** South African Jour. Sci. **15**: 226–234. 1918.—The altitude of Winterhoek Peak is 6,818 feet, and the character of the vegetation together with the various species encountered is noted for different levels throughout this range of altitude. Author believes "it is exposure which determines the altitude at which the mountain flora begins, and this may be as low as 3000 feet or as high as 5000 to 6000 feet." Following the classification of Raunkiaer, "nearly 60 per cent of the species are prostrate plants with winter buds below the surface of the soil, or a few inches above the ground-level (hemicryptophytes and chamaephytes), while the bushes (nanophanerophytes) constitute only 15.10 per cent of the flora. If the geophytes and therophytes, as a general class, are included with the hemicryptophytes and chamaephytes as representing a type adapted for tiding over adverse climatic conditions, we then find that 79.16 per cent of the flora of the Winterhoek and environs is of this extremely xerophytic type." Attention is also given to the various leaf characters represented, size and color of flowers and types of fruit.—*P. D. Strausbaugh.*

300. Pole Evans, I. B. **The plant geography of South Africa.** Official Year Book Union of South Africa **2**: 51–58. 1919.—This is a reprint of the paper in the Year Book for 1918 [See Bot. Absts. 1, Entry 468.]

301. Raunkiaer, C. **Recherches statistiques sur les formations végétales. [Statistical investigations on plant formations.]** Kgl. Dansk. Vidensk. Selskab. Biol. Meddel. I;. *80 p. 3 fig. 25 tables.* 1918.—The author has here summarized the material of his former contributions and shown something of their applications to the solution of problems of ecological plant geography. His statistical or valence method consists in analyzing a plant population by means of the scrutiny of certain unit areas of 0.1 sq. m. outlined by a metal radius of suitable length attached to a walking stick. From the examination of 25 to 50 such areas the frequency with which a given species occurs is determined and is expressed as a frequency percentage, frequency coefficient or valence. He defines his "formation" as a plant community that is homogeneous from a floristic point of view with respect to the species showing the highest frequency coefficients. In areas that have been relatively undisturbed he believes that an equilibrium will be reached and he formulates a law relative to the occurrence of species within such a community. "In a formation in a state of equilibrium one or more species will prosper at the expense of their neighbors because such dominant species are better adapted to live under the conditions existing within the formation of which they are a part, and by their aggregation they will prevent other species from equalling them in frequency. But however well they may be equipped for such community life they cannot prevent other species, widely disseminated but fewer in individuals, from entering the formation and there occupying portions that for any reason may have been left bare of the dominant species. It follows that there is a much larger number of the less frequent species."—A similar method for determining the relative area occupied by each species is described and a classification of vegetation on the basis of life-forms and leaf-sizes given. [See also Bot. Absts. 4, Entry 198. Also Jour. Roy. Microsc. Soc. 1919: 52–53. Also Nature **103**: 33. Also rev. by Moreau, Bull. Soc. Bot. France **66**: 58–59.]—*Geo. D . Fuller.*

302. Schröder, Bruno. **Die Vegetationsverhältnisse der Schwebepflanzen in Schlawasee [Silesia]. [Vegetational relations of the plankton of the Schlava Lake.]** Ber. Deutsch. Bot. Ges. **36**: 648–659. *2 fig.* 1918.—A seasonal study of the plankton shows that the greatest number of species is found during the summer, the smallest number, a little more than one-third, during the winter season. The schizophytes, chlorophytes and phaeophytes appear throughout the year, the conjugatae primarily during the summer. *Cladothrix* is present the year around. Temporary variations are observed. In the case of *Ceratium hirundinella,* however, the individuals remain unaltered as regards form and size.—*Ernst Artschwager.*

303. Shreve, Forrest. **Vegetation of southern South America. [Rev. of: Skottsberg, Carl. Botanische Ergebnisse der swedischen Expedition nach Patagonien und dem Feuer lande 1907–1909. V. Die Vegetations-verhältnisse längs der Cordillera de los Andes S. von 41° S. br. [Botanical results of Swedish Expedition to Patagonia and Tierra del Fuego, 1907–1909.—V. Vegetation of the Andes south of 41° south latitude.]** Kungl. Svensk. Vet. Handl. **56**: 1–366. *Pl. 23.* 1916.] Plant World **22**: 55–56. 1919.

304. Sim, T. R. **Soil erosion and conservation.** South African Jour. Indust. **2**: 715–724. 1919.—Vegetation is a preservative covering. It is protective against insolation, drought, radiation, wind, flood, and donga formation. The vegetation has an effect on the atmosphere and conversely the atmosphere has an effect on the vegetation. Concentration of water should always be prevented, if possible, but in the lower grades of plant succession, especially where close turf and humus are absent, such concentration is exceedingly dangerous and leads directly to all serious cases of donga formation, erosion of cultivated land and river erosion.—*E. P. Phillips.*

305. Smith, W. G. [Rev. of: Bews, J. W. **The grasses and grasslands of South Africa.** *161 p. Map. 24 fig.* Davis & Sons: Pietermaritzburg. 1918. [See Bot. Absts. 2, Entry 7; 3, Entry 1287.] Jour. Ecol. 7: 84–87. 1919.

306. Taylor, Aravilla. **Mosses as formers of tufa and of floating islands.** Bryologist 22: 38-39. 1919.—In certain chalybeate springs *Brachythecium rivulare* B. & S., assists in the formation of a hard, porous tufa, like that formed by *Cratoneuron filicinum* in calcareous springs. Near the head of Lake Michigan *Campylium stellatum* (L.) Bryhn is one of the chief agents in the formation of surface mats and floating islands in the lagoon ponds and "pannes." —*Edward B. Chamberlain.*

307. Tullsen, N. **The haunts of a naturalist.** Amer. Bot. 25: 137–144. 1919.—A popular account of the vegetation in Knox County, Illinois.—*W. N. Clute.*

308. Turrill, W. B. **Contributions to the flora of Macedonia: I.** Kew Bull. Misc. Sup. [London] 1918: 249–341. 1918.—The Macedonian flora between Salonika and the Struma Plain and Krusa Balkan is considered ecologically under three divisions: hill and foothills floras, nullah flora, and plain flora. The most striking plant of the hills, which nowhere reach above 1000 meters, is the Kermes oak, *Quercus coccifera*; this oak constitutes a distinct shrub formation, suggestive of the maqui. Amongst the oaks is an abundant annual flora. The nullahs are gorges or ravines, cut in the solid rock of the hills or in the diluvium of the foothills or plains; by reason of moisture and protection from the sun, they maintain an abundant vegetation through the heat of summer. The plains have the best agricultural lands, and these show a rich weed flora, especially since their abandonment during the war. Notes follow, dealing with seasonal succession and floristic affinity. [See Bot. Absts. 2, Entry 4, Entry 368. Abs. Nature 102: 395.]—*H. C. Cowles.*

309. Watson, W. **The bryophytes and lichens of calcareous soil.** Jour. Ecol. 6: 189–198. 1918.—A comparative study of the bryophyte and lichen flora of various calcareous substrata. The areas treated include the chalk, the older limestones with ash woods, exposed limestone rocks, limestone grasslands, and limestone pavements. The conclusion is reached that, while there may be some doubt as to the relative importance of physical and chemical soil factors in so far as these influence the distribution of the higher plants, in regard to many bryophytes and lichens there is little question that chemical factors are the more important. Detailed lists of species are given. See also Jour. Roy. Microsc. Soc. 1919: 74.—*G. E. Nichols.*

310. Watson, W. **The bryophytes and lichens of fresh water.** Jour. Ecol. 7: 71–83. 1919.—A comprehensive summary of the bryophyte and lichen flora characteristic of different types of freshwater habitat in Britain, with detailed lists, incidental attention being given to seed-plants and algae. Four principal groups are distinguished: the "subformations" (1) of foul waters, (2) of slowly moving waters relatively rich in mineral salts, (3) of slowly moving waters relatively poor in mineral salts, (4) of quickly flowing streams. These are variously subdivided. Bryophytes and lichens are absent in foul waters; they are most abundantly represented along quickly flowing streams, upwards of 250 bryophytes and nearly 50 lichens being listed as characteristic of the fourth subformation. Attention is called, among other things, to various structural peculiarities exhibited by species growing in the different types of habitat, and to their distribution with reference to the calcareousness of the water.—*G. E. Nichols.*

FLORISTICS

311. Alm, Carl G. **Bidrag till södra Norrbottens flora. [Contribution to the flora of south Norrbotten (Sweden).]** Svensk. Bot. Tidskr. [Stockholm] 13: 102–104. 1919.—A list of 78 plants with the localities where each was found.—*W. W. Gilbert.*

312. Alvarez, O. P. **Descripción geográfica de la Isla de Formosa.** [Descriptive geography of Formosa.] [Chapter III. Botany.] Bol. R. Soc. Geogr. Madrid 60: 445–499. 1918. —Chapter III of this work is devoted to a general treatment of the flora of Formosa, taking up first a history of published work, principally that of Hayata, Matsumura, and Kawakami, then giving a partial enumeration of the plants, particularly the economic species. Fragoso in review notes that it is a curious work without scientific pretensions but worth reading. Through abst. by Fraooso, R. Gz. in Bol. R. Soc. Española Hist. Nat. 19: 288. 1919.

313. Andrews, A. LeRoy. **Dicranoweisia crispula in the White Mountains.** Rhodora 21: 207–208. Nov., 1919.—An account of a station established for this moss in 1917 by the Cold Brook of King's Ravine in the White Mountains of New Hampshire. Also gives the record of other stations at which the species is known to occur.—*James P. Poole.*

314. Anonymous. **Resistant chestnut.** Amer. Bot. 25: 25. 1919.—The suggestion is made that many plants may have become extinct through the attacks of microscopic organisms rather than through changes of climate, as usually stated.—*W. N. Clute.*

315. Beauverd, Gustave. **Esquisse synécologique comparative de deux marais des environs de Baulmes.** [A synécological comparison of two marshes in the vicinity of Baulmes.] Bull. Soc. Vaudoise Sci. Nat. 52: 17–93. 1918.—A study of two marshes, the Marais de Rances and the Marais de la Baumine, on the mid-slopes of the Jura Mountains, in Canton Vaud, Switzerland. Though having the same altitude and subsoil, the two marshes have notable floristic differences. The Marais de Rances has a disjunct lowland element, represented by *Gentiana baltica* and *Phyteuma tenerum.* There are also tree relicts, attesting to a former forest condition. The Baumine plants are of mountain affinities, the plants being largely typical of subalpine pastures, such as those of the headwaters of the Baumine stream. [See Bot. Absts. 1, Entry 795.]—*H. C. Cowles.*

316. Bennett, Arthur. **Vaccinium intermedium Ruthe.** Jour. Botany 57: 284–285. 1919.—A note on the occurrence of this plant in England. It was called forth by a paper in the preceding number of Jour. Botany (p. 259).—*K. M. Wiegand.*

317. Bennett, Arthur. **Carex montana L. and Calamagrostis stricta Timm.** Jour. Botany 57: 322–323. 1919.—Notes on occurrence of this plant in Great Britain.

318. Bicknell, Eugene P. **The ferns and flowering plants of Nantucket—XX.** Bull. Torrey Bot. Club 46: 423–440. 1919.—This article forms the conclusion of the series on Nantucket. In this catalogue have been listed 1136 species including 33 natural hybrids. A general discussion is given of the affinities of the flora, a list is made of species with their northern or eastern limit on the island, and one, of the northern species reaching their southern limit here or on Long Island. The number of introduced species is also discussed.—*P. A. Munz.*

319. Campbell, Douglas Houghton. **The derivation of the flora of Hawaii.** Leland Stanford Junior Univ. Publ. Univ. Ser. *34 p.* 1919.—The generally accepted view as to the origin of the Hawaiian Islands, which are entirely volcanic, holds that they were thrown up from the ocean depths and always have been isolated; but another view, which the author accepts as the most satisfactory explanation of the origin of the flora, holds that Polynesia, including the Hawaiian Islands, is the remains of a once extensive land mass, either a single continent or several large continental islands.—"Some such connection seems necessary to explain the great preponderance of Australasian and Malayan types in the flora, especially such forms as offer no ready means of transport by any known agency." Fifty-one genera of spermaphytes and 37 species of pteridophytes occur in Hawaii which are common to the Australasian-Malayan region, but not found in America, while only 6 Hawaiian-American genera of spermaphytes and two species of pteridophytes are found in Hawaii and not in the Australasian-Malayan region. "The great preponderance of Indo-Malayan elements in the

Hawaiian flora is sufficiently evident. Not only is the number of extra-American genera common to the two regions very large, but a majority of the endemic genera are evidently derived from southern Pacific or Asiatic types."—The American elements are of two kinds: first, those which have been introduced since the isolation of the islands, mostly from the west coast of North America, through the agency of wind or of migratory birds; and, second, certain genera allied to South American types which very possibly may be residual forms from an era when there was a connection between South America through some extensive Antarctic continent with New Zealand."—An objection to the continental theory has been the absence of Coniferae, expecially such southern types as *Araucaria*, *Podocarpus* and *Agathis*, and other old types which are abundant in the Australasian-Malayan region. "The probable explanation is the possibility of the extinction of these forms after the isolation of the islands. There are plenty of examples of such disappearances of plants from regions which they once inhabited." These extinctions may have been brought about by various causes such as diseases and climatic changes. "The almost complete absence of granitic or calcareous soils, for example, would practically prohibit the growth of many species that might very well have been present at an earlier period before the submergence of areas now completely covered by volcanic formations." Detailed accounts of the animals give strikingly similar results; especially is this true among the molluscs, insects, arachnida, marine invertebrates, and fishes. [See also Bot. Absts. 1, Entry 822; 3, Entry 1608; also Plant World 22: 57. 1919.]—*LeRoy Abrams.*

320. Cheeseman, T. F. **The vascular flora of Macquarie Island.** Sci. Rept. Australian Antarctic Expedition of 1911–14. C7: 63 *p. Pt. 3. Map.* 1919.—Lying 600 miles south-west of the Island of New Zealand, 920 miles south-east of Tasmania and 970 miles from the Antarctic continent, the position of Macquarie Island is one of great isolation. It is little more than a short range of mountains with peaks ranging from 900 to 1424 feet in height, the length of the island being 21 miles and its breadth less than 4 miles. The hills descend rapidly towards the sea forming bold headlands and precipitous cliffs with no harbors or sheltered bays. It possesses a remarkably equable temperature, the mean maximum being 43°.5F. and the mean minimum 37°.9F. while the extreme range is only 24°.8F. A rainfall of 45 inches is distributed so that no month has less than 3 inches. Wind velocity is uniformly great, averaging 18 miles per hour. It has an impoverished vascular flora of 30 seed plants, 3 ferns and 1 lycopod. Concerning the origin and affinities of this flora Cheeseman decides that with the exception of three endemic grasses it dates no further back than the last glacial epoch. The repopulation was probably effected through the agency of birds as half its plant species are common to New Zealand, 15 are found also in Fuegia or South Georgia, and a like number are circumpolar.—The vegetation is characterized by the entire absence of trees and shrubs. The conspicuous plant forms are the tussock grasses, principally *Poa foliosa*, the large leaved "Macquarie Island cabbage," an araliaceous plant resembling a fine rhubarb, the cushions of the umbelliferous *Azorella Selago*, globular masses often four feet across, and a purple composite, *Pleurophyllum Hookeri*, with long sage-green leaves. The tussock grass is by far the most important of these forms occupying much of the mountain slopes. Rev. by Fuller in: Bot. Gaz. 69: 95. 1920. Other reviews in: Nature **104**: 101. 1919. Jour. Botany **57**: 262. 1919. Plant World **22**: 184. 1919.—*Geo. D. Fuller.*

321. Clute, Willard N. **A trip to Navajo Mountain.** Amer. Bot. 25: 81–87. *Pl. 1.* 1919.—Navajo Mountain on the borders of Arizona and Utah has never been visited by botanists. The surrounding desert has few species of flowering plants, but the mountain above 7000 feet had a conspicuous summer flora consisting of eriogonums, pentstemons, lupines, evening primroses, painted cups, and golden-rods. A full list of the species is to be published later.—*W. N. Clute.*

322. Coville, F. V. **The threatened extinction of the box huckleberry, Gaylussacia brachycera.** Science 50: 30–34. July, 1919.—As the title indicates, the article is designed to call attention to the fact that the Box Huckleberry is in danger of extinction; at the present time the only localities in which the plant is known to exist are in Perry County, Pennsylvania,

and in Sussex County, Delaware. In Pennsylvania the plant is confined to a single patch 400 yards in length, and in Delaware, the plant covers an area only about 8 feet square. The author suggests that these plants may have been originally chance seedlings from seeds carried by birds. In spite of careful search no evidence of seedlings was found, and the author advances the theory that the patch in either case has originated from a single plant; in this case the plant is more than one thousand years old, judging from the length of the rootstock increment. If the patch consists of one plant, that plant may be partially or completely sterile to its own pollen, hence the absence of seedlings. Portions of the Pennsylvania and Delaware plants have been brought together at Washington, cross pollinations have been made, and fruit has set, but the fruit is not mature at the time of writing.—*A. H. Chivers.*

323. Darlington, Henry T. **Weed immigration into Michigan.** Michigan Acad. Sci. Ann. Rept. 20: 261–267. *1 fig.* 1918. The data given cover a period of approximately 75 years (1839–1913). Of the 149 weeds listed for the state, 100 were introduced during this time. The climax of immigration occurred during the 23 years from 1881 to 1904 when 41 weeds were introduced. The author correlates this with the increase in number of wagon-roads and railroads that came about at this time with the more rapid settling of the state. A list of weeds is given, together with a statement of percentages introduced from the various different sources.—*P. D. Strausbaugh.*

324. de Vries, Hugo. **Das Wandern der Pflanzen. [The migration of plants.]** Naturwissenschaften 7: 81–89. 1919.—A critical survey is given of that group of causes of geographical distribution which has to do with the outer factors of existence which may cause changes in the species and may permit a rapid or slow migration of the plants. De Vries leaves out of consideration in this article a group of inner causes of distribution which has to do with the change of species and the development of new species from those already existing. In general, the youngest species live where they originated while the oldest plant species are those with the widest distribution. (De Candolle found 90 per cent of all plant species to be confined to single districts and, therefore, to have migrated but little from the area of their origin.) The classical examples of plant migration are the exceptions. The best studied cases are those which have followed the wake of man and De Vries confines himself more or less to a study of these cases. He refutes the opinion that migration itself is a cause of the change of species and a factor in the origin of new species. From a study of the distribution of such plants and the conditions of their environment, as *Larrea tridentata*, *Polygonum amphibium*, *Elodea canadensis*, *Salsola Kali*, as well as a few fungi, he reaches the following conclusions: (a) the species character of the migrating plants, as a rule, remains unchanged in new environments; (b) during periods of migration many new species may be found, but such new species show no direct relation to the environment; (c) most of the diagnostic species characters are useless characters as far as the "struggle for existence" is concerned; (d) the many cases of adaptation in nature are due to generic characteristics which originated in earlier geologic periods, of whose climate, etc., we know too little to venture a judgment as to the value of these generic characters to the plant under the conditions of those times; and (e) the facts speak against an origin of new characters through adaptation but rather teach that these are inherited independently of adaptation.—*Orton L. Clark.*

325. Dodge, C. K. **Contributions to the botany of Michigan.** Univ. Michigan Mus. Zool. Misc. Publ. 4: 1–14. 1918.—A record of species of vascular plants not previously recorded for Michigan, as well as extensions of range for a number of plants known only from limited portions of the state. These records are based almost entirely upon collections made by the author.—*E. A. Bessey.*

326. Dodge, C. K. **Contributions to the botany of Michigan. II. Observations on the flowering plants, ferns, and fern allies growing wild in Marquette County, Michigan, in 1916 and 1917, especially in the vicinity of the Huron Mountain Club.** Univ. Michigan Mus. Zool. Misc. Publ. 5. *44 p. With map.* 1918.—The paper is the result of two seasons of collecting by the author, particularly in the Huron Mountain part of Marquette County, together with a study of collections made by others in the same county. The manuscript was completed just before the death of the author. [See Bot. Absts. 3, Entry 1289.]—*E. A. Bessey.*

327. Domin, K. **Dritte Dekade neuer Adventivpflanzen aus Böhmen. [Third decade of new adventive plants from Bohemia.]** Oesterreich. Bot. Zeitschr. 67: 264–267. 1918.

328. Dufrenoy, J. **Diversité écologique et coefficients géneriques. [Ecological difference and generic coefficients.]** Bull. Trimest. Soc. Mycolog. France 35: 27–46. 1919.—The author states that the number of genera and the number of species of parasitic fungi within a certain region depends upon ecological conditions. In order to show this, the author selected (1) a region having great ecological variations (the Valley of Barèges) and (2) several places of more or less uniform character (a grain field, sand hills near the ocean, etc.). In the first mentioned region he observed 11 genera of rusts represented by 52 species, 26 genera of other fungi represented by 40 species, and 3 genera of parasitic bacteria represented by 7 species, giving the following generic coefficients: rusts = 20 per cent, fungi in general = 40 per cent. On the other hand in places of small ecological difference the author found in one place 8 genera of fungi represented by 10 species = 80 per cent. In other places he found 3 genera represented by 3 species = 100 per cent; 10 genera represented by 11 species = 90 per cent; and 11 genera represented by 12 species = 90 per cent. This shows that generic coefficients among parasitic cryptogams as well as among phanerogams depend upon ecological differences.—*Fred C. Werkenthin.*

329. Fernald, M. L., R. C. Bean, and C. H. Knowlton. **Field trips of the New England Botanical Club, 1919.** Rhodora 21: 143. 1919.—A report, by the Committee on Field Excursions, of the field trip of the club, May 29–31, into the Berkshire region with a center at Pittsfield, Mass. Typical sections of nine townships were explored and about 500 specimens were collected; many of them were previously known from only one or two stations in the state, among them *Salix serissima* conspicuously in flower. At least eight plants new to the state were collected. Plans for a Labor Day trip to the ponds and bogs of western Rhode Island and adjacent eastern Connecticut are also discussed.—*James P. Poole.*

330. Ferris, Roxana Stinchfield. **A new plant record for California.** Bull. Southern California Acad. Sci. 18: 13. 1919.—*Holacantha emoryi* is recorded from California.—*L. R. Abrams.*

331. Flynn, (Mrs.) Nellie F. **Field meeting of the Vermont Botanical Club.** Rhodora 21: 191–192. Oct., 1919. A short account of the annual field meeting of the club at North Hero on Lake Champlain, August 5–6, 1919. Followed by similar accounts of the meetings of 1917 and 1918—*James P. Poole.*

332. Frödin, John. **Några växtlokaler mellan Kebnekaise och norska gränsen [Some plant-localities between Kebnekaise [a mountain in northern Sweden, lat. 67° N.] and the Norwegian boundary].** Bot. Notiser **1918**: 211–213. 1918. The localities of 62 arctic-alpine species are given.—*P. A. Rydberg.*

333. Garland, L. V. Lester. **New county records for Argyle [Scotland].** Jour. Botany 57: 322 1919.—This is a list of new finds in Argyle during a visit there in September.—*K. M. Wiegand.*

334. Gertz, Otto. **Några äldre litteraturuppgifter om Vaccinium vitis idaea L. f. leucocarpa Aschs. et Magn. [Some old reports on Vaccinium vitis idaea L. f. leucocarpa Aschs. and Magn.]** Svensk. Bot. Tidskr. [Stockholm] 13: 109–110. 1919.—Author gives the three known localities in Sweden where the white whortleberry has been found and a brief resumé of the literature relating to their discovery.—*W. W. Gilbert.*

335. Harper, Roland M. **An interesting peat bog in New York City.** Jour. Amer. Peat Soc. 11: 8–11. *2 fig.* Jan., 1918.—A bog of interest, partly because of its urban position, and partly because of the abundance of *Decodon.* It is for many miles the only station of *Chamaedaphne* and *Sagittaria Engelmanniana.*—*H. C. Cowles.*

336. Harper, Roland M. A sketch of the forest geography of New Jersey. Bull. Geog. Soc. Philadelphia 16: 107–125. *3 pl. Map.* Oct., 1918.—The different geographic regions of the state are mapped and briefly described with reference to soil, topography, and tree growth. The trees are listed for each region and the most abundant species are indicated. In the state as a whole, the white oak is the most generally distributed tree, with the red maple a close second; the pitch pine holds first place from the standpoint of numbers.—*P. D. Strausbaugh.*

337. Harper, Roland M. The supposed southern limit of the eastern hemlock. Torreya 19: 198–199. Oct., 1919.—*Tsuga canadensis* (L.) Carr., not previously seen further south in Alabama than Winston and Marion Counties, was found by the writer on the banks of Village Creek, about 3 miles southwest of Adamsville, Jefferson County, Alabama, on Sept. 2, 1919. —*J. C. Nelson.*

338. Heimlich, Louis F. The trees of White County, Indiana. Proc. Indiana Acad. Sci. 1917: 387–471. *34 pl.* 1918.—Though primarily taxonomic, this paper is of interest to plant geographers, because of its maps, showing the distribution in the United States and by counties in Indiana of six species of *Quercus*, two species of *Viburnum* and *Salix*, *Betula lutea*, and *Malus ioensis*. [See Bot. Absts. 1, Entry 798.]—*H. C. Cowles.*

339. Hemsley, W. B., and others. Flora of Aldabra: with notes on the flora of the neighbouring islands. Kew Bull. Misc. Inf. [London] 1919: 108–153. 1919.—Aldabra, or Aldabra Group, is an atoll in the Indian Ocean, 220 miles northwest of Madagascar. The series contains the islands of Aldabra, Assumption, Cosmoledo, Astove, Farquhar, Providence and St. Pierre situated between longitudes 45°E. and 52°E., and between latitudes 9°S. and 10.5°S. The list contains 68 species of vascular plants of which 18 are endemic to Aldabra, 13 are limited to Aldabra and adjacent islands while 18 occur also in Madagascar and 11 are found in East Africa. There is added a summary of present knowledge of the flora of Gloriosa, the Amirantes group, Coetivy, Agalega, Cargados, the Laccadives, Maldives, and the Chagos Archipelago. A bibliography of 26 titles completes the paper.—*E. M. Wilcox.*

340. Ingham, W. Mosses and hepatics of the magnesium limestone of West Yorkshire [England] [Continued]. Rev. Bryologique 41: 77–82. 1914. [Issued in 1919.]—This is the concluding portion of an article the first part of which appeared in 1914 (Rev. Bryologique 41: 53–58). The region studied is very dry during the summer but affords more favorable conditions for the development of bryophytes during the winter. In many districts the limestone is honey-combed with old and long-disused quarries, which afford excellent collecting grounds. The author lists from his own collections 170 species and varieties of mosses and 24 species of hepatics, giving detailed data in each case. At the close of the paper he lists 28 additional species of mosses and 17 additional species of hepatics found by earlier collectors.—*Alexander W. Evans.*

341. Knowlton, Clarence H. An excursion to Mt. Washington, Massachusetts and the Bash-Bish Falls. Rhodora 21: 198–202. Nov., 1919.—An account of a one day collecting expedition to the region named, giving the general topography of the region and a list of the principal species collected. This list is compared with collections made by others in the same region. The locality proved to be interesting mostly because of the large number of species collected and the unexpected contrasts in the flora with variations in the topography and situation.—*James P. Poole.*

342. Knowlton, C. H., and Walter Deane. Reports on the flora of the Boston district. —XXX. Rhodora 21: 78–83. Apr., 1919.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reports species and their distribution in the district about Boston, Massachusetts. [See also next following Entry, 343.]—*James P. Poole.*

343. Knowlton, C. H., and Walter Deane. **Reports on the flora of the Boston district. —XXXI.** Rhodora 21: 125–128. 1919.—A continuation of the report of the Committee on Local Flora of the New England Botanical Club. Reports species and their distribution in the district about Boston, Massachusetts. [See also next preceding Entry, 342.]—*James P. Poole.*

344. Lindfors, Thore. **Sydskandinaviska element i Frostvikens flora [South Scandinavian elements in the flora of Frostviken** (Province of Jämtland, Sweden)]. Bot. Notiser **1919**: 127–136. 1919.—The plants belonging to this element are nearly always confined to localities favored with southern exposure, only exceptionally in groves on level ground with calcareous soil. The author records 14 such "south-mountains" or "south-hills," and gives the localities of 25 South Scandinavian plants in this region of northern Sweden.—*P. A. Rydberg.*

345. Lindquist, H. **Utbredningen inom europeiska Ryssland av Carex arenaria L., Carex ligerica Gay [= C. colchica Gay, C. pseudoarenaria Rchb.) och Carex praecox Schreb. (= C. Schreberi Schrank). [The spread into European Russia of Carex arenaria L., C. ligerica Gay and C. praecox Schreb.]** Svensk. Bot. Tidskr. [Stockholm] **13**: 100–102. 1919.

346. Little, J. E. **Notes on Bedfordshire plants.** Jour. Botany **57**: 306–312. 1919.—A list is given of publications dealing with the flora of Bedfordshire. The present paper presents a selection of records supplementary to the "Field flowers of Bedfordshire," by W. F. Bunker, 1911. Hillhouse suggested that the county be divided somewhat on the basis of the surface geology into 49 divisions, a number wholly unworkable on any extended scale, and not desirable for so small a county. The Victoria County History divides the county on the basis of river basins, making 7 divisions, which may be merged into 5. The present records all fall in Hillhouse's southern half (soil chiefly cretaceous). Rev. Chas. Abbot's Flora Bedfordensis (1798) contained several names of plants not now known there, and also some which were rare then but are now more common. The new records with stations and critical notes, are comprised in a list several pages in length.—*K. M. Wiegand.*

347. Long, Bayard. **Notes on the American occurrence of Crepis biennis.** Rhodora **21**: 209–214. 1919.—The genus *Crepis*, native to the Old World, is represented in eastern United States by several introduced species. It has been the consensus of opinion that four of these have become well enough established to be recognized as elements of our flora. Among these is *C. biennis* which is credited by the American manuals with a more or less extended range from New England southward to Pennsylvania and westward to Michigan. In verifying the records of the range of this species the writer found only one authentic herbarium specimen from Pennsylvania, one from Vermont, collected by Pringle in 1875, and a third collected in North Carolina in 1888. All other records were based on wrongly labelled specimens of other species. Since the large collections examined showed only these three authentic specimens and these from ancient collections, much new evidence is needed to maintain this species as an element of our flora.—*James P. Poole.*

348. Long, C. A. E. **Notes from Matinicus [Maine].** Rhodora **21**: 148. 1919.—Five or six plants of *Amsinckia Douglasiana A.DC.*, a native of California, were found growing in and near an abandoned chicken yard on the Island of Matinicus, twenty miles off the Maine coast. The identification was made by M. L. Fernald. It is as yet uncertain whether this plant has become established or is a casual.—This same island is a hitherto unpublished station for *Typha angustifolia L.*, although the station has been known to the writer for a number of years. The most easterly station previously published was the lower Kennebec.—*James P. Poole.*

349. Lundequist, Olof. **Några anmärkningsvärda växter från Gränna och Visingsö [Some noteworthy plants from Gränna and Visingsö** (Sweden)]. Svensk. Bot. Tidskr. [Stockholm] **13**: 104–106. 1919.—A list of 28 plants is given with brief notes on locality, date and collector.—*W. W. Gilbert.*

350. MacCaughey, Vaughan. **The endemic palms of Hawaii: Pritchardia.** Plant World 21: 317-328. Dec., 1918.—A general discussion is given of the genus *Pritchardia*, which includes all the endemic palms of the Hawaiian Islands. The author indicates the geographical distribution of sixteen species, and the outstanding features of the roots, trunks, leaves, and inflorescences, common to all the species are described.—*Charles A. Shull.*

351. MacCaughey, Vaughan. **The pala or mule's-foot fern (Marattia Douglasii (Presl.) Baker) in the Hawaiian Archipelago.** Torreya 19: 1-8. Jan., 1919.—This species, which is common to the Fiji Islands, is the sole representative of the Marattiales in the Hawaiian flora. Its presence there may be explained by introduction from the Fiji Islands, either naturally or through human agency, or it may be a relict of a more widespread display of Marattiales on a former greatly enlarged Hawaii, "Pan-Hawaii-land." [See Bot. Absts. 2, Entry 979.]—*H. C. Cowles.*

352. MacCaughey, Vaughan. **The genus Morinda in the Hawaiian flora.** Plant World 21: 209-214. Aug., 1918.—A brief description of the Rubiaceous genus *Morinda*, followed by a more detailed description of the two Hawaiian species: *M. citrifolia* and *M. trimera.* The first of these is a familiar dye-tree of India, Malaya and the Pacific islands, a fact that may account for its migration into the Hawaiian islands. The second species is endemic and may have arisen as a mutant from *M. citrifolia.*—*P. D. Strausbaugh.*

353. Moxley, G. L. **A botanical trip to Catalina Island.** Amer. Bot. 25: 93-94. 1919.

354. Nelson, J. C. **The rarity of Conopholis.** Amer. Bot. 25: 151. 1919.—*Conopholis americana* reported as not rare in Kentucky.—*W. N. Clute.*

355. Nelson, J. C. **Species east and west.** Amer. Bot. 25: 70-71. 1919.—A comparison of the flora of Boone County, Kentucky, with that of Chelan County, Oregon, shows that while the total number of species is about the same, there are only 47 species of plants that appear in both lists; when the introduced species are eliminated, only 17 species are found in both lists, and these are recognized as cosmopolitan.—*W. N. Clute.*

356. Nelson, J. C. **Oregon Chenopodiums.** Amer. Bot. 25: 112. 1919.

357. Nelson, James C. **The grasses of Salem, Oregon, and vicinity.** Torreya 19: 216-227. 1919.—A list is given of grasses growing spontaneously in that part of the Willamette Valley adjacent to the city of Salem, prefaced by brief notes on topography and climate. 108 species are enumerated, of which 57 are introduced and 51 native. The preponderance of introduced individuals is noted. A steady increase of introduced species is predicted. The grass species are classified ecologically in six societies, riparian, hydrophyte, xerophyte, silvicole, submontane and ruderal.—*J. C. Nelson.*

358. Nordberg, Arne. **Ny fyndort för Cypripedium. [A new locality for Cypripedium.]** Bot. Notiser. 1919: 167. 1919.—*Cypripedium Calceolus* L. is recorded from subarctic Sweden, at Sunderbyskogen, Nedre-Luleå Parish, and a list is given of 17 other plants associated with it.—*P. A. Rydberg.*

359. Nordstedt, O. **Sandhems Flora 6. Tillägg. [Flora of Sandhem, 6. Additions.]** (Swedish.) Bot. Notiser 1918: 309. 1918.—Many additional plant localities recorded.—*P. A. Rydberg.*

360. Petch, T. **Oxalis in Ceylon.** Ann. Roy. Bot. Gard. Peradeniya 7: 47-51. 1919.—Notes on the introduction and spread, as weeds, of *Oxalis corymbosa* DC. and *O. latifolia* HBK.—*E. D. Merrill.*

361. Phelps, Orra Parker. **Ranunculus Boraeanus in eastern New York.** Rhodora 21: 208. Nov., 1919.—Plants of this species, which has not before been noted in America, found in New York and identified at Gray Herbarium. The species is native to continental Europe. —*James P. Poole.*

362. Pretz, Harold W. **Discovery of Trisetum spicatum in Pennsylvania.** Rhodora 21: 128–132. 1919.—On July 15, 1917, the writer collected, near Slatington, Pennsylvania, a specimen of *Trisetum spicatum.* The plant was found rather evenly distributed and quite abundant about the open outcrops of the rather short, steep part of the shale slopes close to the tracks of the Lehigh Valley Railroad. A brief discussion of the habitat and the associated species is given.—As far as the writer knows this plant has not been previously reported as occurring between New York and North Carolina. The article is concluded with a discussion of the physiographic and geographic relation of this station to those previously reported.—*James P. Poole.*

363. Ringenson, C. A. **Sedum villosum L. två gånger funnen i Jämtland. [Sedum villosum L. found twice in Jämtland.** (Sweden)] Svensk. Bot. Tidskr. [Stockholm] **13:** 106. 1919.

364. Rydberg, P. A. **Phytogeographical notes on the Rocky Mountain region. VIII. Distribution of the montane plants.** Bull. Torrey Bot. Club **46:** 295–327. 1919.—The montane zone of the Rocky Mountain region is defined. The number of species included is given as about 1900, 13 per cent of which are transcontinental; 18.5 per cent are common to the Rockies and Canadian zone of the east, 30 per cent common to the Rockies and the Pacific mountains, and over 53 per cent are endemic. A comparison is also made of the species of the northern and of the southern Rockies.—*P. A. Munz.*

365. Standley, Paul C. **A new locality for Senecio Crawfordii.** Rhodora **21:** 117–120. 1919.—All of the specimens of *Senecio Crawfordii* cited by Greenman in his monograph of the genus were from southeastern Pennsylvania and western New Jersey. The writer cites a new locality discovered in May 1917 in a bog near Suitland, Maryland, a few miles east of Washington. A somewhat detailed description of the station and similar bogs is given, together with a list of the characteristic species found in them. These are also the characteristic species of the pine-barrens of New Jersey, although no pine-barrens exist in the region cited. The habitat of the species in Maryland is different from that in which it occurs in Pennsylvania and New Jersey, where it is not in a pine-barren association.—*James P. Poole.*

366. Strömman, P. H. **Lepidium Smithii Hook. funnen i Skåne. [Lepidium Smithii found in Skåne** (Sweden).] Svensk. Bot. Tidskr. [Stockholm] **13:** 106–107. 1919.

367. Thompson, H. S. **Galium erectum in Somerset [England].** Jour. Botany **57:** 286. 1919.—A note on the occurrence of this plant.

368. Turrill, W. B. **Contributions to the flora of Macedonia. II.** Kew Bull. Misc. Inf. [London] **1919:** 105–108. 1919.—This is a list of seed plants collected by J. M. Russell during July and August, 1918, in the Paprat District, Krusa Balkan, Central Greek Macedonia. The collection adds materially to the number of species recorded in flower under the extreme xerophytic conditions of mid-summer, during which time, with the exception of xerophytes, green vegetation is restricted to such protected habitats as the nullahs. Forty of the species were previously recorded [Kew Bull. 1918: 249–341. See also Bot. Absts. 4, Entry 308.] while fourteen are here listed for the first time.—*E. M. Wilcox.*

369. Wangerin, Walther. **Die pflanzengeographische Bedeutung der Verbreitungsgrenze von Buche und Fichte für das nordostdeutsche Flachland. [The phytogeographic significance of the distribution limit of beech and spruce for the lowland of northeast Germany.]** Ber. Deutsch. Bot. Ges. **36:** 559–571. 1918 [Feb., 1919].—The beech has by some been considered to constitute a border line form separating the European from the Russian-Siberian flora. Other investigators consider the beech forest to form a transition zone between middle and eastern Europe. The spruce is more difficult to interpret, and opinions regarding its importance are at variance. The beech associates may be typical companion plants and cease at the limits of the beech forests; or they may be only apparent beech associates, and extend beyond the domain of the beech.—*Ernst Artschwager.*

370. Weatherby, C. A. Long Pond. Rhodora 21: 73–76. Apr., 1919.—An account of a botanizing expedition to Long Pond in the town of Thompson, Connecticut, where many species not previously reported from that part of the state were found.—*James P. Poole.*

371. Willis, J. C. **The floras of the outlying islands of New Zealand and their distribution.** Ann. Botany 33: 267–293. *2 fig.* 1919.—The series of studies in which the age-and-area hypothesis was tested in connection with the flora of the New Zealand region is here continued with reference to three sets of outlying islands, the Kermadecs, Chathams and Aucklands. Assuming the hypothesis to be correct the author makes thirty-two predictions regarding the constitution and distribution of the floras of these islands. Every prediction is verified when the actual facts are examined. The facts do not support the theory of natural selection. From these results and those of previous studies the conclusion is drawn that the principle of age-and-area is perhaps the chief positive factor in determining the distribution of plants about the globe, the chief negative factor being the action of barriers. A restatement of the hypothesis is made.—*W. P. Thompson.*

372. Wilson, E. H. **A phytogeographical sketch of the ligneous flora of Korea.** Jour. Arnold Arboretum 1: 32–43. July, 1919.—An account of the ligneous vegetation of Korea and adjacent islands. The geological formation and its influence on the distribution of the woody plants are described, also the topography of the area in question which comprises 84,173 square miles. The surface rocks of Korea are granites, metamorphosed pre-Cambrian rocks, palaeozoic rocks, mesozoic limestones, and basalt. The country is very mountainous, and has no extensive plateaus nor plains. The original forest covering has been destroyed over fully two-thirds of the country, extensive forests remaining only in the extreme north. The elements of the flora are mainly boreal in character, and essentially those of North China, Manchuria and Japan; broad-leafed evergreens are almost absent. At least one ligneous genus, *Pentactina* and a limited number of species are endemic. The flora of the islands of Quelpaert and Dagelet shows closer relationship to that of Japan, with some endemic species on each. Woody plants make up about one-fourth of the phaenogamic flora, which consists of 2832 species thus far recorded. The more important and noteworthy trees and shrubs are mentioned with notes on their general aspect, distribution and economic importance. The largest deciduous tree is *Populus Maximowiczii*; *Quercus mongolica*, *Betula Ermanii* and *Prunus serrulata* var. *pubescens* are the most widely distributed trees. The commonest coniferous trees are *Pinus densiflora* and *P. koraiensis.* The author discusses succession of forest growth as exemplified by the forests of Korea. The concluding paragraphs deal with trees and shrubs of economic and ornamental value.—*Alfred Rehder.*

373. Wilson, E. H. **The Bonin Islands and their ligneous vegetation.** Jour. Arnold Arboretum 1: 97–115. 1919.—After an account of the history of the islands and some remarks on their geological features the author, who spent two weeks on these islands, discusses their ligneous vegetation. Lists of all the trees, shrubs and woody climbers hitherto known from these islands are given, and a list of vernacular names with their botanical equivalents concludes the article.—*Alfred Rehder.*

FLORISTICS

374. Chaney, Ralph W. **The ecological significance of the Eagle Creek flora of the Columbia River gorge.** Jour. Geol. 26: 577–592. *4 fig.* 1918.—In a preliminary report upon fossil plant material found in the gorge of the Columbia River, in Oregon and Washington, Chaney notes that some 80 species are represented; 75 of these are angiosperms, of which 2 only are monocotyledons. A list of the genera with the number of species in each includes: *Ginkgo* 1, *Pinus* 1, *Smilax* 1, *Cyperacites* 2, *Populus* 3, *Salix* 3, *Hicoria* 2, *Juglans* 1, *Alnus* 1, *Carpinus* 1, *Corylus* 1, *Castanea* 1, *Quercus* 12, *Ulmus* 2, *Planera* 2, *Magnolia* 1, *Laurus* 2, *Platanus* 2, *Liquidambar* 3, *Crataegus* 1, *Sterculia* 1, *Rhus* 1, *Ilex* 1, *Acer* 3, and *Fraxinus* 1.—From a study of this material the author concludes that the climate indicated by this Eagle Creek flora appears to have been somewhat warmer and drier than at present. The length of the epoch is

to be placed at thousands rather than at scores of years. The dominant plants point to the existence of two habitats, one xerophytic and the other mesophytic. An area of upland dissected by a valley furnishes such habitats and at the same time meets the geological requirements of the formation. [See Bot. Absts. 1, Entry 1603.]—*Geo. D. Fuller.*

375. Clements, F. E. **Scope and significance of paleo-ecology.** Bull. Geol. Soc. Amer. 29: 369–374. 1918.—The article is a general statement of the scope and character of paleo-ecology and of some of the results that may be hoped for from its application to some of the problems of geology. The conclusions are summarized by the author in the statement that "Paleo-ecology is characterized by its great perspective, due to the absence of a large body of facts. This causes the fundamental correlations between the physical world and vegetation on the one hand and between vegetation and the animal world on the other to stand out in clear relief. As a consequence, paleo-ecology is an unspecialized field in which the inter-relations of climate, vegetation and animals play the paramount rôle. The emphasis necessarily falls on vegetation, because it is an effect of climate and topography, and a cause in relation to the animal world, and hence serves as a keystone in the whole arch of cause and effect." [See Bot. Absts. 1, Entry 1604.]—*Geo. D. Fuller.*

376. Guppy, H. B. **The island and the continent.** Jour. Ecol. 7: 1–4. May, 1919.—Referring to Hooker's discussion of insular floras the author agrees with him that islands have been the refuges of the ancient vegetation of continents. On the Micronesian Islands in particular he sees the wrecks of a very ancient flora once more widely spread and flourishing in the warmer and moister Tertiary period but expelled and largely destroyed during a succeeding age of aridity. Australia is regarded as giving the plant record of lost eras of much of the globe and Madagascar as recounting the tale of lost ages in the tropical zone. The question of continental connections is regarded as a dead issue and the distribution of conifers is accepted as the best guide to past continental extensions.—The article is rather a general statement of the situation under discussion than a contribution of fresh data regarding the character of insular floras.—*Geo. D. Fuller.*

377. Holmsen, Gunnar. **Lidt om grangränsen i Fämundstrakten. [Norway spruce in Fämund, Norway.]** Tidsskr. Skogbruk 27: 39–48. Mar.–Apr., 1919.—It has been a generally accepted theory that Norway spruce reached Norway from Russia by way of Finland and Sweden, that sufficient time has not yet elapsed for it to cover every nook and corner of the country as shown by the present distribution. The author has endeavored to throw light on this question by a microscopic study of pollen in old swamp deposits. Pollen grains of spruce have thus been readily identified when present. Though there remain many unsolved problems, this study indicates strongly that spruce is no younger on the peninsula than the other forest trees. It appears that the immigration of spruce took place toward the end of the sub-boreal or in the early sub-atlantic era and that spruce appeared earlier in the northern and eastern part of Sweden than elsewhere.—*J. A. Larsen.*

APPLIED ECOLOGY

378. Kincer, Joseph B. **Temperature influence on planting and harvest dates.** Monthly Weather Rev. 47: 312–323. *Fig. 1–20.* 1919.—There are certain restricted limits of time within which crops must be planted for best results, defined by the temperature conditions of the locality. In general the length of the time period for planting decreases with increase in latitude.—A definite amount of heat is required after planting to bring a crop to maturity; one may take as a rough measure of this the accumulated day-degrees of temperature above the mean temperature at planting time. As thus computed there is very little difference in the amount of heat necessary to mature most staple spring planted crops. The mean temperature at planting time for a given crop may be used as a base for any method of temperature summation for that crop, but not as a general base for all crops. If the frequently used 6°C. base be employed in the case of cotton, for example, we would begin the reckoning of effective

temperatures in the vicinity of Abilene, Texas, about three months before planting can begin, with a resulting indicated large accumulation of effective temperature before any growth is possible.—Spring wheat seeding begins with a lower mean temperature than any other major spring crop, for example, in the Dakotas and in Nebraska when the normal daily temperature rises to 37°F. and in Minnesota and Wisconsin when 40°F. is reached. Next in thermal order come spring oats, the seeding of which usually begins when the normal daily temperature rises to 43°F. Early potato planting begins as a rule when the normal daily temperature rises to 45°F. and corn when 55°F. is reached. The dates on which the latter is reached correspond closely to the average dates of the last killing frost in the spring. Cotton planting usually does not begin until the normal daily temperature rises to about 62°F. The dates on which this temperature is reached correspond closely to the latest dates for a killing frost.—Cotton and corn are warm-weather crops and the areas in which these can be successful productions on a commercial scale are limited principally by general temperature conditions and the temperature at which planting may be accomplished. These limits are defined by an available thermal constant of about 1600°F. for corn and about 2000°F. for cotton, computed from the normal temperature when planting usually begins. If cotton could be planted with as low temperatures as corn, the cotton area would be materially increased.—Owing to the relatively large thermal requirements of corn and cotton, a comparatively warm spring is necessary for the best results in germination and early growth.—*Joseph B. Kincer.*

379. McLean, Forman T. **The importance of climatology to tropical agriculture.** Philippine Agric. 7: 191–194. 1919.—A brief discussion of the relation of the climate (temperature, evaporation, wind, sunlight, rainfall, etc.) to Philippine agricultural crops, with a plea that adequate investigations be instituted as a basis for instruction in climatology at the College of Agriculture.—*S. F. Trelease.*

380. Sampson, Arthur W. **Plant succession in relation to range management.** U. S. Dept. Agric. Bull. 791: *76 p. 26 fig.* 1919.—A study of plant succession in the vicinity of the Great Basin Experiment Station in Utah with especial reference to the use of plant consociations as determiners of factors necessary to the improvement of grazing ranges. Four plant consociations are discussed, namely, the wheat-grass, the porcupine-grass-yellow-brush, the foxglove-sweet-sage-yarrow and the ruderal-earlyweed consociations. The nature of each of these plant succession groups is illustrated in detail by a treatment of such factors as conditions of growth and reproduction, soil water content, effect of disturbing factors, palatability and forage production. The most ideal conditions of soil fertility, and moisture for optimum forage production on a given range are indicated by plants of the wheat-grass groups and the least ideal conditions by plants of the last named group in the order above enumerated. The prevalence of plants of any one of these consociations thus becomes an indicator of whether or not destructive factors may be at work. Overgrazing by removing the original ground cover facilitates soil erosion which in turn reduces the fertility and humus content. This reduction in turn results in the introduction of the plant consociation next lower in the scale. Protection of the depleted range may be accomplished in part by grazing only after seed production rather than grazing before seed production. There is included a list of the most common species found in each consociation which may be used as an indicator of the condition of the range.—*E. V. Hardenburg.*

381. Sampson, Arthur W., and L. H. Weyl. **Range preservation and its relation to erosion control on western grazing lands.** U. S. Dept. Agric. Bull. 675. *35 p.* 1918.—In the Manti National Forest of Utah the destruction of the vegetation carpet by overgrazing, especially by sheep, has resulted in serious damage by erosion. The peak of this destruction is in the spruce-fir basins, where the slopes are steep, the trees sparse, and the summer grazing conditions good. On eroded areas new successional stages are seen, and the reestablishment of the more desirable species for grazing means good range management extended over a term of years. Deferred and rotation grazing and stock control are necessary. Damage resulting from long-continued erosion can best be overcome by terracing, planting, and the construction of dams. See Bot. Absts. 2, Entry 18; Exp. Sta. Rec. 39: 439–440; also rev. by: Toumey in Jour. Foresty 16: 814–817.—*H. C. Cowles.*

382 SIM, T. R. **Soil erosion and conservation.** South African Jour. Indust. 2: 867–881. 1919.—Where the grassveld is so vigorous that it cannot be grazed sufficiently by the full stock of the farm without annual or frequent burning, then that veld is naturally tree veld rather than grass-veld. Where the grass-veld and some cultivation carry the full stock of the farm through successive years without grass burning, there is little excuse for burning. The destruction of a bush which has existed for centuries results in the area reverting to grass land for a time, followed later by further retrogression.—*E. P. Phillips.*

383. SMITH, W. G. **The improvement of hill pasture.** Reprint from Scottish Jour. Agric. 1: 1–8. July, 1918.—Hill pasture is defined as "land never ploughed and not enclosed as fields. Sixty per cent of the area of Scotland (18,000 square miles) is uncultivated land or hill pasture." Different types of herbage occur and these represent distinct plant associations which the author designates by applying the name of the dominant plant, or some term descriptive of the general habitat. Each association "indicates some particular combination of climate, soil, and grazing animals." The principle upon which improvement is based is found in the fact that the herbage changes in proportion to the changes effected in conditions under which it grows.—(1) Alluvial and flush grassland, the former occurring on the alluvial borders of streams and the latter occupying areas of seepage associated with the outflow of springs, represent the better type of hill grassland. Such areas are made more extensive by irrigation. Water draining from peat soils must be conducted away from alluvial grassland by definite channels, as it is injurious to the grasses of this association. Places where water lodges must also be drained. (2) The bracken association includes a fine grassy herbage which can be developed by removing the taller bracken either by cutting or spraying with 5 per cent sulfuric acid. (3) Heather land characterised chiefly by *Calluna* may be improved by burning with due regard to proper rotation; a fifteen year rotation is recommended in which one-fifteenth of the moor is burned each year. (4) Plant herbage consisting mainly of segdes (*Eriophorum* and *Scirpus*) and heather may be improved by drainage or burning depending upon the types of herbage desired. (5) Rough grass and bent consisting of mat grass (*Nardus stricta*), blow grass (*Molinia caerulea*) and dwarf heather occur on the "higher hills of southern and central Scotland." Improvement is effected by removing the previous season's growth in order to induce a fresh early growth. Burning in large blocks is advised and grazing by hardier breeds of cattle to reduce the roughness of the herbage. On such areas spring flushing and diverting of the surface water favors the substitution of the rough grass by a finer herbage.—*P. D. Strausbaugh.*

384. WELLS, MORRIS M. **The relation of ecology to high school biology.** School Sci. Math. 18: 439–446. May, 1918.—Teaching biology requires more effort than in better standardized subjects, as physics and chemistry. There are two main problems; the organization of the course, and the securing of material. Ecological methods should be introduced. Teachers should become thoroughly acquainted with local regions. Plants and animals should be studied together. Ecology deals with the organism as a whole, and takes little account of the physiology of organs. Ecology is essentially natural history. Biology is awakening from the lethargy of extreme specialization. The man who revolutionized biology in 1859 was not a product of a man-made laboratory, but a scientist who secured his information from the laboratory of nature. The transfer of the study of biology from the laboratory to the field will be the procedure followed by all enthusiastic teachers.—*A. Gundersen.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

J. V. Hofmann, *Assistant Editor*

385. Aldaba, Vicente C. **Cultivation and tapping of Castilloa rubber in the Philippines.** Philippine Agric. 7: 274–307. 1919.—The author reports observations and experiments on trees of *Castilloa elastica* in a plantation in Davao, Mindanao, where conditions are favorable for this plant. Discussions are given of methods of cultivation, diseases and pests, light requirements, growth rates, variations in amount and quality of rubber, improvement by selection, spacing, and tapping methods.—*S. F. Trelease.*

386. Anonymous. **The cultivation of basket willows.** Jour. Bd. Agric. Great Britain 25: 1424–1432. 1919.

387. Anonymous. **Ninety-seventh report of the commissioners of His Majesty's woods, forests and land revenues, dated 27 June, 1919.** *53 p.* London, England. 1919.—A statistical report on these subjects with brief comments and explanations. Exclusive of land let for building purposes, foreshores and mineral rights, the Crown property in charge of the Commissioners includes about 350,000 acres, of which about 69,554 acres are under the growth of timber. Parts of these woodlands are subject to common rights, and, in addition, 126,646 acres of unenclosed wastes are subject to common rights. The total gross income for the year was £1,115,185 and the expenditure £367, 561. For the preceding year these figures were £1,057,190 and £364,430, respectively. In order to supply in part the nation's needs for railway sleepers (crossties), pitwood, etc., thus reducing timber imports, extensive felling and sawing operations were continued in several of the Crown forests, especially in the New Forest, and large quantities of timber were sold to the Controller of Timber Supplies and others. To provide for planting the areas of woodland cleared during the war (and also for the afforestation of other areas), over 44 millions of plants have been raised from seed sown in 1915, 1916, and 1917. About two million surplus plants available last autumn, after meeting the immediate Crown requirements, were disposed of, principally to nurserymen at estimated cost prices, under conditions restricting the price to be charged by them on resale to landowners and others. The 1918 seed crop was a very poor one, but notwithstanding this, further large quantities of seed were purchased abroad and a considerable amount of larch and Scotch pine seed was collected at home. Steps were taken to replant parts of the areas recently felled, but the work was restricted by the shortage of labor. The school for foresters or woodmen students at Parkend (Dean Forest), which was extended to accommodate a larger number of students, and which had been temporarily closed by the war, was reopened February 20, 1919. It is intended to use Dean Forest and the adjoining woodlands of Highmeadow, Abbotswood and Clearwell as a forestry demonstration area whenever the school for forest students, near Speech House, is developed.—*E. R. Hodson.*

388. Anonymous. [Rev. of: Müller. **Über die kursächsische Oberforst- und Wildmeisterei im Erzgebirge. (The forest and game administration in the Erzgebirge under the Electorate of Saxony.)** Tharandter Forstl. Jahrb. 1917: 26. Also 1918: 91, 342.] Forstl. Rundschau 20: 10–12. 1919.—Form of organization of forest and game administration, officials and their duties, regulations and methods, during the period 1500 to 1800.—*F. S. Baker.*

389. Anonymous. **Better packages and how to know them.** Sci. Amer. 120: 546, 559–560. *4 fig.* 1919.—Descriptive of wooden boxes and methods of testing their strength.—*Chas. H. Otis.*

390. Anonymous. **Camphor.** Agric. News [Barbados] 18: 385. 1919.—The author, after noticing the camphor shortage in the United States and the present high prices ruling for the product, passes on to a discussion of the different kinds of camphor trees and the degree of success which has attended the cultivation of camphor in different countries. Mention is made of trials in the West Indies, particularly in Dominica and Trinidad where camphor trees are being planted as windbreaks and hedges.—*J. S. Dash.*

391. Anonymous. The Coos County forests. Sci. Amer 120: 3. 1919.

392. Anonymous. The dendrograph. Sci. Amer. 120: 365. 1919.—Descriptive of two types of apparatus for recording growth and other variations in the dimensions of trees.—*Chas. H. Otis.*

393. Anonymous. Enhetliga inmätningsregler för rundvirke. [Uniform rules for measuring round timber.] Skogen 6: 247–252. 1919.—Uniform rules have recently been adopted in Sweden for measuring fire wood, pulpwood, and saw timber. Fire wood is measured in cubic meters; pulpwood and saw timber may be measured either in cubic meters or in English units. The rules also prescribe how different classes of material shall be piled for measuring.—*G. A. Pearson.*

394. Anonymous. Forest fires of spontaneous origin. Sci. Amer. 120: 47. 1919.

395. Anonymous. Japanese air-cushions of paper. Sci. Amer. 121: 463. *1 fig.* 1919.—An industry utilizing bamboo fiber.—*Chas. H. Otis.*

396. Anonymous. Das Papierholz. [Wood for paper.] Oesterreich. Forst- u. Jagdzeitg. 1926: 314. December 5, 1919.—Paper industry in Austria demands larger amounts of wood every year and it is becoming difficult to secure within reasonable distance. Branchwood and tops do not appear usable to any great extent. Trunkwood of rapid growth, having narrow fall rings and a light colored heart is a necessity for the manufacture of high grade paper.—*F. S. Baker.*

397. Anonymous. [Rev. of: Anonymous. A new drying oil. Paint Mfrs. Assoc. Circ. 75. 1919.] Jour. Franklin Inst. 189: 62. 1920. Oil from seeds of *Aleuritis trisperma* or soft lumbang found to be an excellent drying oil on a par with tung oil.—*Ernest Shaw Reynolds.*

398. Anonymous. [Rev. of: Marchet, Julius. Waldflachen und Holzproduktion von Osterreich. [Forest areas and wood production of Austria.] Vienna, 1919.] Oesterreich Forst- u. Jagdzeitg. 1924: 303. Nov. 21, 1919.—Statistics on forest products in Austria.—*F. S. Baker.*

399. Anonymous. [Rev. of: Trocknung und Konservierung von Holz durch Elektrizität. (Drying and preserving wood by electricity.) Deutsche Drechsler Zeitg. 2. 1915.] Oesterreich. Forst- u. Jagdzeitg. 1922: 294. Nov. 7, 1919.—A current of electricity passed through green wood oxidizes the resinous components of the sap, causes a physical change in the wood structure that makes it stronger and more resistant to decay and kills all decay spores, rendering the wood aseptic. In practice the freshly cut wood is placed in piles not over 1 or 1.5 meters high through which a current of 80 to 100 volts is passed transversely. Three to 6 kilowatts per cubic meter are required to complete the treatment.—*F. S. Baker.*

400. Anonymous. Why there is a limit to forests. Sci. Amer. 121: 191. 1919.—It is held that the clearing of the land has frequently paved the way for industrial and agricultural expansion, which has produced greater wealth than did the forest industries in their prime.—*Chas. H. Otis.*

401. Bamber, M. Kelway. The rubber manuring experiments at Peradeniya for 1918. Tropic. Agriculturist 52: 185–189. 1919.—Five years' results of fertilizer experiments on rubber plants are reported which show an excess of acid phosphate to have the greatest effect on late production while general manures, excess nitrogen, and excess potash have lesser effect in the order named. Full report of details given in Bull. 36, June 1918, of Peradeniya Exp. Sta., Ceylon.—*R. G. Wiggans.*

402. Barre, H. W. Creosoting fence posts. South Carolina Agric. Exp. Sta. Bull. 201: 1–15. *Fig. 1–2.* 1919.

403. Besemfelder, Eduard R. Heimisches Terpentinöl und Harz. [Domestic turpentine oil and rosin.] Forstwiss. Centralbl. 41: 49–53. 1919.—During the war a method was devised by which pine lumber can be dried in three days. The process yields a considerable amount of turpentine and rosin as by-product. The total pine wood cut each year in Germany could yield some 378,000 metric tons of extract, of which about one-fourth would be oils, the rest turpentine and rosin. The total consumption of imported pine oils by German industries amounted in 1913 to 57,000 tons, worth 39,000,000 million marks. Since spruce yields as much oil as pine, this process opens an opportunity for wood pulp manufacturers, who use both woods.—*W. N. Sparhawk.*

404. Bibb, T. W. Burning the profits. A problem confronting the lumber industry of the Pacific Coast. Sci. Amer. 121: 110–111. *4 fig.* 1919.

405. Brown, W. H. Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes. Philippine Bureau of Sci. Publ. 13: 1–434. *Pl. 1–41, fig. 1–30.* 1919.—See Bot. Absts. 4, Entry 180.

406. Brubaker, H. W. A study of the oil from sumac (Rhus glabra). Jour. Indust. Eng. Chem. 11: 950. 1919.—Sumac oil compares favorably in properties with other vegetable oils such as cottonseed or corn oil and may find a use as an edible oil or in the soap making industry or as a semi-drying oil in the paint industry.—*Henry Schmitz.*

407. Butler, O. M. "Built-up wood." Amer. Forest. 25: 1410–1414. *7 fig.* 1919.—An article dealing with experimentation with laminated wood and certain manufactured articles therefrom, as conducted at the Forest Products Laboratory at Madison, Wisconsin.—*Chas. H. Otis.*

408. Chancerel, L. Note sur les meilleures essences de boisement dans la region du centre. [Note on the best species for reforestation in the region of The Centre.] Ann. Sci. Agron. Française et étrangère 35: 285–287. 1919.—Following some variety testing of leafy and resinous trees, begun in 1909, recommendations are made for reforestation in the region of The Centre, where a maximum of woody material in a short time was desired. The plantings were made in a poor sandy soil, which was dry in the summer, wet in places in the winter and, on the whole, unfit for agricultural purposes. Recommendations are as follows: (1) Leafy: *Quercus palustris*, *Quercus rubra* and *Quercus phellos*; *Betula nigra var. rubra*; *Alnus cordifolia*; *Populus balsamifera*, *Populus nigra var. angulata robusta.* (2) Resinous: *Pinus maritima Hamiltoni var. Corte* mixed with *Pinus sylvestris* vars. *Riga* and *Scotica*; *Pseudotsuga Douglasii*; *Picea Menziesii*; *Cedrus deodara.*—*A. B. Beaumont.*

409. Chapman, H. H. Forestry as a vocation. Amer. Forestry 25: 1075–1077. 1919.

410. Clopper, H. S. The "Wye Mills oak." Amer. Forestry 25: 1482–1483. *3 fig.* 1919.—Describing a remarkable old tree located in Queen Anne County, near Wye Mills, Maryland.—*Chas. H. Otis.*

411. Cowan, James. Crop production in the northern sandhills. Nebraska Agric. Exp. Sta. Bull. 171. *8 p.* 1919.—See Bot. Absts. 4, Entry 52.

412. Dahl, A. L. Trees for the desert. Uncle Sam to re-forest barren areas. Sci. Amer. Supplem. 87: 188–189. *5 fig.* 1919.

413. Daniels, O. T. [Forest fires in Nova Scotia.] Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 52–58. 1919.—An account is given of forest fires in Nova Scotia in 1918, their extent and causes. The number of acres burned over was 58,380 and the total damage was $139,110.—*Paul A. Murphy.*

414. Davis, R. O. E. Erosion in the Appalachian and Piedmont regions. Amer. Forestry 25: 1350–1353. *5 fig.* 1919.

415. De Boer, S. R. **Landscape architecture in our national forests and parks.** Amer. Forestry 25: 1459–1464. *8 fig.* 1919. Concerns recreation and recreation facilities.—*Chas. H. Otis.*

416. Eberts. **Die Jagd in den Staatsforsten der grösseren deutschen Bundesstaaten. [The hunt in the state forests of the larger German states.]** Forstwiss. Centralbl. 41: 41–49, 91–101, 132–148. 1919.—Methods of administering and utilizing the game resources of the state forests of Prussia, Bavaria, Saxony, Württemburg, Baden, Hesse, Mechlenburg-Schwerin and Brunswick are described in considerable detail. The system of leasing hunting privileges to the highest bidder often yields a larger net income at first, but is likely to result either in depletion of the game or overstocking harmful to the forest, is bad for the morale of the forest personnel, often leads to friction, and injures the communal hunting business both by depleting the reservoirs of game on the larger state forests and by reducing their income from leases through competition for lessees. The best method for all interests concerned is a system of state administration of hunting, through the forest personnel, with the income turned over to the treasury and costs paid by it. In a number of the states this system now prevails in whole or part of the forest area.—*W. N. Sparhawk.*

417. Eberts. **Die Lohnbewegung im forstlichen Betriebe. [The wage agitation in the forest industry.]** Forstwiss. Centralbl. 41: 201–210. 1919—Following the Revolution, the introduction of the eight-hour day has been accompanied by insistent demand for higher wages in all branches of industry, which have finally gone far beyond the level justified in the increased cost of living. The expectation that with the return of millions of soldiers wages would come down has not been fulfilled, but rather the opposite. The unemployment allotments have resulted in demoralization of the workers, who prefer to congregate in the cities and do nothing (there were 170,000 unemployed men in Berlin in January, 1919) than to work at agriculture or forestry in the rural districts where there is a great shortage of laborers. The eight-hour day is not suited to either of these industries, because of the irregular nature of the work. Particularly in forestry, is the piece-work system desirable, since it allows the peasant to work in close proximity to his dwelling, at times which suit his convenience and do not interfere with his work on his farm. The Government plans to take steps to educate the workers to realize that unduly high wages will have most serious results on the working classes themselves. In case of forest laborers this will be accomplished through the workmen's councils which are to be chosen in each Oberforsterei by the year-long employees. High wages in forest industries will result in high wood prices, which will react on many other industries. The great housing shortage is not being met by new building because of high cost of labor and material. A workman's 3 or 4 room house which could be built for 4500 marks and rented for 300 marks per annum before the war, now costs at least 12,000 marks and rents for 900 marks. Because of higher cost of mine timbers, coal costs more, and the high price and shortage of coal has brought fuelwood to two or three times its pre-war price. All of this affects the working classes more than anyone else.—*W. N. Sparhawk.*

418 Eklöf, C. E. **Tjädalens anläggnig och skotsel. [The preparation and care of a tar pit.]** Skogen 6: 189–210. *Fig. 1–12.* 1919.—The process of extracting tar from pine stumps is described in considerable detail. The yield is from 20 to 30 liters of tar per cubic meter of wood. Charcoal is obtained as a by-product in amount equaling 5 or 10 per cent of the original volume of the wood.—*G. A. Pearson.*

419. Engler, Arnold. **Tropismen und excentrisches Dickenwachstum der Bäume. Ein Beitrag zur Physiologie und Morphologie der Holzgewächse. [Tropisms and eccentric thickening in trees. A contribution to the physiology and morphology of woody plants.]** Preisschr. Stiftung Schnyder von Wartensee 21: 1–106. *14 pl., 13 fig.* Beer and Co.: Zürich, 1918.—See Bot. Absts. 3, Entry 691.

420. Eulefeld. Zahlen-Nachweisung aus dem Privatwald. [Numerical evidence from a private forest.] Forstwiss. Centralbl. 41: 53-57. 1919.—The assertion frequently made that German forests were greatly overcut during the war is not generally true. The writer cites the records for a forest under his charge, comprising 12,000 hectares, about half softwood and half hardwoods, with a stock of more than 3,300,000 cubic meters of wood and an annual cut of about 90,000 cubic meters. The actual cut during each of the four years 1915 to 1918 was less than that provided by the working plan. A table shows the annual cut for every year since 1899, and for single years as far back as 1577.—*W. N. Sparhawk.*

421. Fabricius. [Rev. of: Kubelka, August. Moderne Forstwirtschaft. (Modern forest management.) Vienna and Leipzig, 1918.] Forstwiss. Centralbl. 41: 148-152. 1919.—Kubelka develops a "Femelstreifenschlag" (selection strip cutting), different from the system described by him under the same name in 1912, which was really only a slightly modified form of Wagner's "Blendersaumschlag" (selection border cutting). Under the new system, the whole stand is first subjected to a preparatory cutting, then the stands are laid off in strips from 30 to 50 meters wide (height of trees) running at right angles to the direction of reproduction. In every fourth strip large and small holes are cut clean, varying from a diameter equal to the height of the trees, down to half that. The other strips are undisturbed, except for the preparatory cutting. Later the middle remaining strips are treated in the same way, then the others. As soon as reproduction is established in the openings, they are gradually enlarged. Depending on the period allowed for reproduction, the stand can be made into a practically even-aged one, or into a conglomeration of small even-aged stands varying from each other by 60 years.—The reviewer questions some of Kubelka's conclusions as to the efficacy of his method, such as: that insect damage is greatly reduced; that danger from storms is little greater than in virgin forest. Kubelka recommended the method for general application under all conditions in the forests of central Europe, although he has only tried it on a few private forests for 6 years or less, and the high yields in material and money which he claims were the result of the methods he seeks to change. It is doubtful whether at this time Europe is in condition to suffer the loss in forest production which must result from transforming existing forests into small broken-up stands.—*W. N. Sparhawk.*

422. Fankhauser, F. Zur Kenntnis der Lärche. [Facts about the larch tree.] Zeitschr. Forst- u. Jagdw. 51: 289-297. *Pl. 1-3.* 1919.—A discussion regarding the factors governing the distribution of the larch (Larix) in the Swiss Alps. It is an erroneous supposition that larch requires a deep soil, for in the Swiss Alps it also grows on rocky, shallow soiled cliffs. Its chief requirement is a fresh soil which must however have a good and *constant* supply of moisture. Lacking this, the larch is apt to perish. It is the heaviest water transpirer of all the conifers, in Switzerland. In support of this assertion the morphological characters are noted and also the fact that the larch is the only conifer which sheds its needles (in order to reduce water loss). Observations show that in periods of drought the larch survives by shedding its needles where other conifers perished. Attention is called to fact that, owing to differences in densities of crowns, various varieties of larch have been (probably erroneously) described. The distinctions are probably based on differences in moisture content of sites. For instance, the larch forms a very compact crown where it grows on deep and well watered soils, while on dry sites (e.g., south exposures), the crown becomes very open and pointed (see plates illustrating differences). Where the larch grows in mixture with other trees it succeeds only so long as there is sufficient, and constant water available. Hence it does poorly in mixture with spruce or fir, whose crowns prevent rain water from falling readily to the surface soil. In mixture with beech on the other hand, larch does well, for, during the winter, rainwater is readily admitted to the soil, through the open crowned beech, and in the summer a greater amount of precipitation is allowed to drop to the ground along the branches and stems of the beech. Moreover, the shed leaves of the beech form a protective covering, thus conserving surface moisture. Much has been written concerning the light requirements of the larch but it seems apparent that moisture is the controlling factor.—*Hermann Krauch.*

423. Fernald, M. L. **Lithological factors limiting the range of Pinus Banksiana and Thuja occidentalis.** Rhodora 21: 41–67. *1 fig.* March, 1919.—Bot. Absts. 4, Entry 283.

424. Fischer, E. **Neueres über die Rostkrankheiten der forstlich wichtigsten Nadelhölzer der Schweiz. [Recent information about important rusts of conifers of Switzerland.]** Schweiz. Zeitschr. Forstw. 49: 113–120. 1918.—See Bot. Absts. 3, Entry 713.

425. Friedrichs, Oscar v. **Undersökning över feta koniferoljor. [Investigations of fatty conifer oils.] I. Undersökning av tallfröolja. [Investigations of pine seed oil—Pinus silvestris L.]** Svensk Farm. Tidskr. 23: 445–451, 461–463. 1919.—The author investigated the fatty oil content of the Swedish grown Pinus silvestris L. and includes a table for comparison of the physical properties of these oils with those reported by Grimme in Germany and DeNegri and Fabris in Italy.—The fatty oils described in this paper consist of volatile and nonvolatile fatty acids (both saturated and nonsaturated), glycerine and a phytosterin. The nonvolatile fatty acids compose 90.4, the volatile 0.11, the glycerine 7.5 and the raw phytosterin 1.29 per cent of the fatty oils. Of the fatty acids 3 per cent are solid, and 97 per cent fluid. The solid fatty acids consist of 5 per cent Stearic and 95 per cent Palmitic. In the case of the unsaturated fatty acids 36.2 per cent is Oleic, 56.2 per cent Linolic, and 7.6 per cent Linolenic acid. The undistilled residue is a phytosterin which is presumably sitosterin.—*A. M. Hjort.*

426. Friedrichs, Oscar v. **Undersökningar över feta koniferoljor. [Investigations of fatty conifer oils.] II. Undersökning av granfröolja. [Investigation of spruce-seed oil—Picea abies Karsten.]** Svensk Farm. Tidskr. 23: 500–505. 1919.—The author investigated the fatty oil content of the seeds of Swedish grown spruce—Picea abies Karsten, and includes in this paper a table comparing the results he obtained, pertaining to the physical properties, with those reported by Grimme in Germany and DeNegri and Fabris in Italy.—The fatty oils consist of volatile and nonvolatile fatty acids, both saturated and unsaturated; glycerine and raw phytosterin. The nonvolatile fatty acids comprise 91.6 per cent, the volatile (Butyric acid) 0.14 per cent, the glycerine 7.5 per cent and the raw phytosterin 1.37 per cent of the fatty oils.—The nonvolatile fatty acids consist of 0.70 per cent saturated and 99.3 per cent unsaturated acids. Of the saturated fatty acids palmitic acid is the only one present. Of the unsaturated fatty acids 42.75 per cent is Oleic, 49.55 per cent Linolic and 7.7 per cent Linolenic acid.—The undistilled residue consists of a phytosterin which is presumably identical with sitosterin.—*A. M. Hjort.*

427. Fuller, George D. **Our national forests.** [Rev. of: Boerker, Richard H. D. **Our national forests.** *238 p. 80 fig.* Macmillan Co.: New York, 1918. (See Bot. Absts. 2, Entry 917.)] Bot. Gaz. 67: 369–370. 1919.—The author "has collected and organized a mass of scattered data and presented them in very readable form." The timeliness of the book is noteworthy, as we are just entering upon a period of appreciation of our forest wealth. Weaknesses of the book are seen in the absence of a bibliography or of a suitable index.—*H. C. Cowles.*

428. Geete, Erik. **Sågkamraten. [A saw-companion.]** Skogen 6: 142–145. *Fig. 1–6.* 1919.—Description of a device for assisting in the operation of a one-man saw. It consists of a large coil spring, one end of which is attached to the tree and the other to the back of the saw. When the saw is drawn toward the operator the spring is stretched out; when the pull is relaxed the spring recoils and pulls the saw back on the reverse stroke.—*G. A. Pearson.*

429. Girard, E. **Notes sur la culture de l'Hévéa en Cochinchine. [Notes on the cultivation of Hevea in Cochinchina.]** Bull. Agric. Inst. Sci. Saigon 10: 289–299. 1919.

430. Graves, H. S. **A policy of forestry for the nation.** Amer. Forestry 25: 1401–1404. 1919.—A statement, more comprehensive than heretofore made by the writer, setting forth the objectives of a national forest policy and the steps to be taken to attain them.—*Chas. H. Otis.*

431. Greeley, W. B. **The forest code and the regime forestier.** Amer. Forestry **25**: 1451–1457. *6 fig.* 1919.—The writer considers the historical development of the "regime forestier," defined as the sum total of laws and administrative decrees applicable to forests under all forms of public ownership, and which is applied today to about one-third the total forested area of France. Typical forestry practice under these laws is described in some detail.—*Chas. H. Otis.*

432. Greeley, W. B. **The forest policy of France—its vindication.** Amer. Forest. **25**: 1379–1385, 1424. *8 fig.* 1919.—A picture of French forestry in the broad,—its historical setting, the national conceptions which it expresses and what it has accomplished.—*Chas. H. Otis.*

433. Grondal, B. L. **The seasoning of lumber.** Sci. Amer. Supplem. **87**: 158–160. 1919. [From the West Coast Lumberman.]

434. Hertz. **Staatsaufsicht für den Privatwald [Governmental supervision of private forests.]** Zeitsch. Forst- u. Jagdwirtsch. **51**: 177–183. 1919.—A plea for the extension and retention of private forests in Germany, but that same be placed under government supervision. Writer claims that state owned forests are less well managed than private tracts. Private ownership tends to stimulate greater diversification in methods and kinds of timber grown. Hence the most intensive use of the various forest sites is accomplished. This is not generally the case with state owned forests. Private ownership also promotes personal thrift and thus is an asset that proves to be of utmost value in times of financial stress. After elaborating on the advantages of private owned forests the writer outlines a plan of governmental control which he believes will result in good management yet not interfere materially with the desires of the owner.—*Hermann Krauch.*

435. Hollick, A. **The story of the Bartram oak.** Sci. Amer. **121**: 422, 429–430, 432. *6 fig.* 1919.—See Bot. Absts. 4, Entry 615.

436. Illick, J. S. **Use the dead and dying chestnut.** Sci. Amer. Supplem. **88**: 252–253. *7 fig.* 1919.—Considers the importance of immediately salvaging, into various building materials and forest products, of trees killed by fungus growth.—*Chas. H. Otis.*

437. Illick, J. S. **When trees grow.** Amer. Forestry **25**: 1386–1390. *9 fig., 2 tables.* 1919.—Based on data obtained in the vicinity of Mont Alto, Pa., the writer states that most of the native and introduced forest trees make 90 per cent of their height growth in less than 40 days. Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short time, finally falls gradually to a minimum and then ceases completely. Actual growth, however, progresses by leaps and bounds, alternating with rest periods, which may be of long or short duration. It is believed that the recurring rest periods may become a rather fixed and regular feature of the growth of certain species, as is noted for pitch pine. The rate of tree growth not only fluctuates throughout the growing season, but also during each day. About twenty trees of each of four species showed that the rate of growth at night was about twice that during the day.—*Chas. H. Otis.*

438. Jentsch, F. **Wald und Waldwirtschaft in Belgien. [The forests and forest management in Belgium.]** Tharandter Forst. Jahrb. **70**: 111–130. 1919.—A rather detailed description of Belgium forests by a German forester who was in that country during the period of occupation. Belgium was originally heavily forested from the river Scheldt to the Ardennes mountains. The extent became gradually diminished through settlement. Deforestation was, however, carried too far, with the result that a great deal of desert land exists to-day, considering such a thickly settled country as Belgium. The fertile portions of north-western Belgium are almost devoid of forests and near the manufacturing centers a poor stand exists. The hilly, south-east portion of the country is, however, quite heavily forested. Altogether, Belgium has about 18 per cent of forested land. Greatest percentage is in Namur (31 per cent) and in Luxemburg (41 per cent). Detailed descriptions of the geological formations and cor-

responding forest types are given. In discussing the management of Belgian forests author points out that the greater part are private and communal. Accordingly, the forests are said not to have been managed so as to yield the highest possible returns.—*Hermann Krauch.*

439. KLEBAHN, H. **Peridermium pini (Willd.) Kleb. und seiner Uebertragung von Kiefer zu Kiefer. [P. pini and its passage from pine to pine.]** Flora 111–112: 194–207. *Pl. 4–5.* 1918. —See Bot. Absts. 3, Entry 774.

440. KORDVAHR. **Gedanken über Zweck und Ziel der Forstwirtschaft. [Notes on the purpose and goal of forestry.]** Zeitschr. Forst- u. Jagdwitsch. 51: 1–6. 1919.

441. KORDVAHR. **Der Wert von Waldbeständen. [Forest valuation.]** Zeitschr. Forst- u. Jagdwirtsch. 51: 140–144. 1919.—A discussion of the factors governing forest valuation. Several formulas are cited.—*Hermann Krauch.*

442. KRUHOFFER. **Die Entwicklung der Forstwirtschaft und des Holzhandels in Elsass-Lothringen. [Development of forestry and the wood industry in Alsace-Lorraine.]** Forstwiss. Centralbl. 41: 57–65, 101–109. 1919.—The forests of Alsace-Lorraine cover 443,451 hectares, of which 138,869 hectares belong to the State. The total annual cut of wood is about 2,000,000 cubic meters. Under the former French control the forests were managed mostly on the selection system, transportation was not developed, and timber was sold on the stump, so that there was a tendency toward monopoly of each unit and lower prices for stumpage than the market justified. The Germans changed this by selling the logs, with the result that there were more bidders and better prices, and numerous local wood-using industries sprang up near the forests. Roads were developed. A high-forest system, with reproduction cuttings, was substituted for the selection system except in the higher Vosges. Spruce and pine, and recently larch and Douglas fir have been introduced in the predominant silver fir stands. 250,000 hectares, three-fourths of it in Alsace, are managed as high forest; 150,000 hectares as coppice-with-standards, and small areas as coppice, tanbark forest, etc. Of the high forest, one-third is silver fir, nearly one-third beech, one-sixth pine, and one-eighth oak. Fir predominates in the Vosges, while pine is in the valleys and foothills; beech is most abundant in the foothills, and oak often predominates in the lowlands. The forests of the Lothringian plateau are almost exclusively hardwoods. The fir grows rapidly, yielding 5 cubic meters per hectare per year, and can yield 7 cubic meters if thinned properly. The wood is used for local needs and the surplus goes down the Rhine. Because of the knotty material produced under the former selection management, it is inferior to the fir from the Black Forest, so unable to compete with it. Beech, formerly chiefly valuable for firewood, has lately found a ready market for railroad ties, while the thinnings bring good prices for fuel. Pine is used chiefly for mine timbers. Oak, formerly managed as coppice-with-standards, is now almost all high forest, and is left standing through two rotations of beech. When the underwood is cut out, the oak standards are trimmed to a height of at least 6 meters, in order to produce clear lumber. Under the German regime, one-fourth of the possible cut each year was reserved to be cut only in emergencies, so that there is now a large surplus of mature timber, expecially in the fir districts. There was a considerable export of sawed lumber to France until it was stopped by high import duties in 1895, since when most of the French trade was in unmanufactured wood, chiefly pulp. The demand for long timbers and large sizes, from Belgium, Holland, and Luxemburg, made up for the loss of the French trade.—*W. N. Sparhawk.*

443. LANE-POOLE, C. E. **Report of the Woods and Forests Department for the year ended 30th of June, 1919. Ann. Progress Rept. Forests Dept. Western Australia.** *26 p.* Perth, 1919.—The work of the Department for the period reported upon is briefly summarized under the following captions: "Classification of Forests, Purchases, Forest Work, Forest Fires, Forest Ranging and Timber Inspecting, Plantation and Nursery Work, Timber Industry, Shipbuilding, Revenue and Expenditure, Botanical, Tan Barks, Commonwealth Forest Products Laboratory, Sandalwood, Legislation, and Publications." Through lack of adequate staff and funds the Department continued purely as a revenue-collecting organization. With-

out trained foresters the Conservator of Forests states that it is impossible to initiate the required silvicultural work. A noteworthy feature of the report is the announcement of the decision to establish a Forest Products Laboratory in Western Australia which will depend on the Federal Government for its funds. The depression of the lumber industry which obtained during the war still existed due to the shortage of ships. The report is appended by detailed statements of revenue and expenditures, timber statistics, a list of herbarium specimens collected and identified, a list of trees raised and planted at the Hamel state nursery and particulars of prosecutions during the year.—*C. F. Korstian.*

444. Legat, C. E. **Forestry in the Union.** South African Jour. Indust. 2: 685–687. 1919.

445. Leopold, A. **Destroying female trees.** Amer. Forestry 25: 1479–1480. *1 fig.* 1919.—After nearly twenty-five years of argument and discussion, the City Commission of Albuquerque, New Mexico, has ordered the cutting down of all female cottonwood trees within the city limits, a ten-year cutting plan having been adopted.—*Chas. H. Otis.*

446. Lindberg, Ferd. **Bredsådd. [Broadcast sowing.]** Skogen 6: 108–111. *Fig. 1–5.* 1919.—Broadcast sowing succeeds well after a fire, where the ground has been prepared, and in drained swamps. Even on unburned ground success is usually assured if the ground is prepared by cultivation. Without soil preparation the amount of seed required is so great as to more than offset the cost of cultivation.—*G. A. Pearson.*

447. Lindberg, Ferd. **Exempel på flertoppighet hos planterade barrträdsplantor. [Examples of forking in planted conifers.]** Skogen 6: 211. 1919.—A survey of several pine plantations showed the percentage of forked plants to be as follows: Single leader, 77 per cent; two leaders, 15 per cent; three leaders, 4 per cent; more than three leaders, 4 per cent. The plantations were established from 1909 to 1913.—*G. A. Pearson.*

448. Mahood, S. A., and D. E. Cable. **Reaction products of alkali-sawdust fusion: acetic, formic, and oxalic acids and methyl alcohol.** Jour. Indust. Eng. Chem. 11: 691–695. 1919.—The data show that 17 to 20 per cent of acetic acid can be obtained from hardwood sawdust by fusion with sodium hydroxide and that a simultaneous production of oxalic acid amounting to approximately 50 per cent of the dry wood is obtained. At lower temperatures, both formic and acetic acid are produced, amounting to approximately 15 per cent each. If the reaction is carried out in a closed vessel, the production of 2.4 per cent of methyl alcohol results.—*Henry Schmitz.*

449. Martin, H. **Die Erhaltung der Buche in Sachsen, inbesondere in gemischten Beständen. [The maintenance of the beech tree in Saxony, especially in relation to mixed stands.]** Tharandter Forst. Jahrb. 70: 83–110. 1919.—Article is conclusion of a series discussing the value of beech in mixture with various conifers. Methods of regeneration and results are given in considerable detail. Series concludes with emphasis on fact that beech has played a far greater rôle in the improvement of forest stands of Saxony than is generally perceived.—*Hermann Krauch.*

450. Maxwell, Hu. **The uses of wood. Floors made of wood.** Amer. Forestry 25. 1343–1349. *10 fig.* 1919.

451. Mayer, Karl. **Die Rotfäule. [The red-rot.]** Forstwiss. Centralbl. 41: 121–127. 185–195. 1919.—Discusses red rot (*Trametes radiciperda*) on spruce near Schongau. This is a morainal region, with the tertiary sublayer exposed along canyons, and with considerable areas of high moor between the moraines. The morainal deposits weather into a fresh sandy loam, which with the heavy precipitation (1250 mm.) is very favorable to forest growth. Where the loam is shallow or cut off by clay at a depth of 10 cm. moors are likely to form. The best timber is on the "hard" soils, while that on the "soft" (moor) soils is not as good. Spruce comprises 95 per cent of the stand, associated with beech and fir on the "hard" soils and with alder and birch on the "soft" soils. Mayer disagrees with Sauer's theory that red

rot was favored by removal of the beech from the spruce stands, and that pole-stands now heavily infested were formerly healthy stands of spruce. He says the rot was always present, but not noticed until wood prices became high, and besides there is as much beech in the mixture as there ever was, or even more. Figures show more rot on sites where beech or other hardwood species are present, than in pure spruce stands. Statistics of rot per cent in conifers cut during 6 years (1912–1917) show a gradual decrease in per cent of rot from 14.4 in 1912 to 10.6 in 1917, due probably to the institution in 1908 of a system of thinnings which take out old defective trees as well as young trees. Then too, the practice of bringing the wood out to roadsides in winter eliminates much of the root injury which formerly occurred. In general, per cent of rot increases with decrease in soil-moisture; the average for "hard" soils was 12.7 per cent, and for "soft" soils 7.1 per cent. Contrary to Sauer's assertion, boggy sites are not especially liable to infection, nor do the figures show rot to be any worse in the first rotation on reforested land which had been used for agriculture. Spruce roots develop very differently on "soft" and on "hard" soils. On moors, the root mass is barely 20 cm. thick and covers 30 square meters or more, with numerous root masses at the periphery, called "paws" (Tätzen) by wood-choppers. These are not due to the presence of beech, since they are common where there is no beech, but are caused by soil conditions. Neither is the dying off of the older roots of spruce retarded by the presence of beech. Whether Trametes is at all responsible is a question. As far as known, the fungus never directly kills a spruce, even though it may have been infected for many years. Red rot probably seldom attacks perfectly healthy trees, but may get in through root injuries caused by wind-stresses, hoofs of cattle, and especially by hauling out logs during the growing season. Red rot causes loss, not by killing the tree or retarding growth, but because of the degrading of the infected wood. In 1917, out of a total cut of about 10,500 cubic meters, 1120 was more or less rotten and sold for less than half of what it would have brought if sound. It will hardly be wise to try to check rot by introducing beech in spruce stands until certain that that will help, because to do so will involve heavy thinnings and a considerably lower yield per acre.—*W. N. Sparhawk.*

452. MIYOSHI, MANABU. **Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal. [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.]** Bot. Mag. Tokyo 33: 185–188. *1 photo.* Sept., 1919.—Describes a new variety of chestnut with weeping branches (*Castanea sativa* Mill. var. *pendula* nov. var.) growing in two localities in the province of Shinano, Japan. Seedlings derived from the older trees show same habit, from which author infers this is a heritable character. The older trees are more than a century old and 3.5 meters in circumference. It is proposed to preserve these two groves as national monuments.—*L. L. Burlingame.*

453. MÜLLER, D. **Die Eiche als Mischholz der Buche im preuszischen Solling. [Oak in mixture with beech in Prussian Solling.]** Zeitschr. Forst- u. Jagdw. 51: 301–307. 1919.—A discussion regarding the advantages and disadvantages of growing beech in mixture with oak. It is necessary to keep oak as an upper story otherwise it will become suppressed by the beech. The mixture succeeds best on warm, sunny sites. On north and east exposures, where beech thrives best, it is difficult to keep the oak in the lead. Different methods of regeneration are described with examples of results obtained. It is found, for instance, that the sudden removal of a beech understory is apt to cause the development of adventitious buds and sprouts on the oak—also stagheadedness. Since it is important to keep the oak as an upper story it is sometimes practical to plant oak seedlings before beech has seeded up an area by natural regeneration. Experience shows however that this method can only be attempted after other vegetation has sprung up in luxuriant form so as to hide the planted oak from deer and other animals, which are otherwise sure to cause severe damage. The use of different species or varities of oak in mixture with beech is discussed.—*Hermann Krauch.*

454. NELSON, J. C. **Deam's trees of Indiana. [Rev. of: DEAM, CHAS. C. The trees of Indiana. State Bd. Forest. Indiana Bull. 30.** *299 p.* Mar., 1919.] Rhodora 21: 188–191. 1919.—An extensive review of the paper cited.—*James P. Poole.*

455. Pack, C. L. **Central Park trees starving to death.** Amer. Forestry 25: 1391–1400. *30 fig.* 1919.—Of some 60,000 trees in Central Park, New York City, 4000 or more have died since 1917, chiefly during the severe winter of 1917–1918. The trees which died would, in the large majority, have withstood the winter had they not been weakened by long years of malnutrition. Of the 3000 dead trees removed in the last 2 years, the greater number were Oriental plane trees; next in number of dead were the elms; third came the oaks and Lombardy poplars; fourth, the lindens; and last, the maples and several other species. The conditions which have led to the death of these trees and the poor condition of others are (1) shallow soil, heavy impermeable clay and hard packing of soil around trees and (2) unfavorable meteorological conditions (there has been a decided decrease in rainfall in the last 20 years, and much of this decrease has been in the summer months when needed most; there has been a decided decrease in relative humidity in the past 5 years, coupled with an increase in the wind movement during the same period; and the trees were subjected to a very severe frost in the winter of 1917–1918).—*Chas. H. Otis.*

456. Patton, R. T. **Timber production and growth curves in the mountain ash [Eucalyptus regnans.]** Proc. Roy. Soc. Victoria. 30[1]: 1–3. *Pl. I–II, fig. 1–4.* 1917. [Received 1919.] —Studies of the annual rings of logs were maae at Powelltown. The timber was considered to be over ripe and many trees showed incipient decay in the heart. It was generally possible to distinguish clearly 80 annual rings. The outer rings beyond these were narrow and less clear, although in one case 125 rings were counted. It was concluded that the tree reached its prime well under 100 years. A remarkable trunk expansion occurred during the first 10 years. The ring width from decade averages for the whole period was shown to decline steadily, probably partly due to overcrowding. Less variation in ring width occurred after the 30th year. The increase in diameter of trees, indicated by decade averages, was so regular (curve) that age could be closely estimated from it. If x represented the age of the tree and y represented the diamater in inches, then $3\sqrt{x}=y$ approximately. The amount of wood produced during the second decade of growth was twice that for the first. The maximum growth occurred in the 5th decade, after the 40th and before the 50th year. The minimum was not fully established. Although the tree reaches maturity (maximum growth) at about 50 years it is not then fit for milling. The growth for the next 10 to 20 years would be, under the local conditions, profitable financially if the crowns remained vigorous because the wood would mature and improve by ripening. In a tree still healthy at 80 years, heart rot was not to be feared. It was found that young trees were not attacked by mistletoe. The decrease in vigor, indicated by the rings and the paucity of foliage, which generally occurred after 70 years, marked a loss of vitality which was thought to make the tree subject to attacks of all kinds.—*Eloise Gerry.*

457. Petraschek, Karl. **Einiges über die angewandte Entomologie in Amerika and ihren Einfluss auf die entomologischen Reformbestrebungen in Deutschland und Deutsch-Österreich. [Notes on applied entomology in America and its influence on the movement for entomological reform in Germany and German Austria.]** Forstwiss. Centralbl. 41: 161–173. 1919. —The biological method of combating insect pests (by favoring the development of their natural enemies) was first suggested to the author in connection with ravages of the gypsy (*Lymantria dispar* L.) and brown-tail moths (*Euproctis chrysorrhoea* L.) and the oak caterpillar (*Cnethocampa processiona L.*) on the south slopes of the Transylvanian Alps in Roumania in 1887, and in Croato-Slavonia and Bosnia in 1889. This method has been developed on an extensive scale in the United States, under the leadership of the Bureau of Entomology (a number of instances are given) and other methods have also been widely studied, especially the use of chemicals. The success of American entomologists in this work, which requires a very thorough detailed knowledge of the insects, their life habits, and their enemies, is attributed to their capacity for going deeply and thoroughly into a study and to their adaptation to observational investigation of practical value, but primarily to the organization of entomological research activity, with its division of work among specialists, and its centralization or correlation by a central agency at Washington.—Prof. Escherich has been striving for de-

velopment along similar lines in Germany, through his Society for Applied Entomology and his Zeitschrift für Angewandte Entomologie, and has laid the beginnings of a Research Institute in Munich, to study methods of combating insect pests injurious to farms, forests, and farm and forest products and articles made from them, as well as to domestic animals and human beings. The Institute is to be exclusively for research, not for instruction, but is to publish its results in language that can be understood by practical farmers, foresters, and manufacturers.—Escherich emphasized the necessity of a universal application of control measures—no use to control a pest on one area and not on the adjacent one—but prefers to accomplish this through education of the public rather than forcibly through laws. This can be done through teachers of winter short-courses, through traveling teachers, and through technically and practically trained insect-pest inspectors who shall keep posted on the development of the science and pass their knowledge on by means of demonstrations and otherwise. There is perhaps not much hope of making the older generation receptive to such educational propaganda, but much can be done with the coming generation, particularly if elementary instruction regarding the principal beneficial and noxious insects can be given in the public schools.—Dr. Seitner is pushing the development of a similar scheme in German Austria. He suggests a central office, well furnished with equipment and trained personnel, and state entomologists or traveling inspectors to collect information and statistics and carry on control work.—*W. N. Sparhawk.*

458. Pratt, M. B. **The glory of the redwoods threatened by fire.** Amer. Forestry 25: 1443–1445. *4 fig.* 1919.—An account of the fires of the summer of 1919, which are said to have been the largest in southern California since 1910. There occurred the first fire in Redwood Park in modern history. One hundred redwoods were destroyed. The big redwoods do not burn readily, but become weakened by brush fires about their bases and finally topple over with a great crash, carrying smaller trees with them. Many of the redwoods had been hollowed by previous fires four hundred or five hundred years ago, and so fell more readily before the flames.—*Chas. H. Otis.*

459. Record, S. J. **Lignum-vitae, the vital wood.** Sci. Amer. Supplem. 88: 4–5, 15–16. *6 fig.* 1919.—The propeller shaft of every large steamship revolves in wooden bearings. Lignum-vitae, of the genus *Guaiacum*, is the only wood suitable for such bearings, and this is due to certain peculiar properties of the wood. The density of the wood enables it to withstand enormous loads; the interwoven fibers keep it from splitting and tearing apart under impact; the infiltrated resin acts as a lubricant, preventing friction and eliminating the danger of an overheated bearing, besides serving to protect the wood from the softening effect of water. Besides this most important use of lignum-vitae for stern bearings, the wood is used for bowling balls, rollers for furniture casters, mallets, sheaves of pulleys, railroad ties, grate fuel and numerous small uses. The sawdust is in demand by the drug trade. Cuban lignum-vitae logs are mostly 4 to 8 feet long, with diameters of 6 to 24 inches, and are of good quality. The lignum-vitae from Jamaica, Bahama Islands and Porto Rico is small, usually not exceeding 5 inches in diameter, and is of good quality. Santo Domingo, Haiti and Nicaragua supply considerable amounts of lignum-vitae. Mexico furnishes but a small amount at the present time. The West Indies will probably continue to supply the bulk of the high-grade lignum-vitae for many years if prices remain at sufficiently high levels to warrant the increased expense attending the more and more difficult logging. Substitutes for lignum-vitae have been suggested and tried for stern bearings and other exacting uses, but nothing acceptable has been found.—*Chas. H. Otis.*

460. Riley, S. **Prevention of forest fire losses.** Amer. Forestry 25: 1260–1263. *7 fig.* 1919.

461. Ronge, Eric W. **Grafiska utbytestablåer. Enkel metod för upprättandet av en praktiskt nöjaktig utbytestablå. [A graphic method of constructing volume tables.]** Skogen 6: 69–84. *Fig. 1–15.* 1919. It is established that each "form class" in trees has a corresponding proportional "taper series" between breast-height and the top of the tree. Thus,

for example, all trees, regardless of height, falling in the "form class" 0.65 taper off as follows: at points 10, 20, 30, 40, 50, etc., per cent of the length of the stem above breast-height, the stem diameters are 94, 88, 81, 73, 65, etc., per cent, respectively, of the diameter at breast-height. The "form class series" varies for different species, due primarily to differences in the development of the crown and consequent differences in the resultant strain produced on the trunk by the wind. For the same species, however, the "form class series" is practically constant over a wide range of conditions. Thus, having determined the points on the bole at which the various inch diameters fall in average trees of given diameter and height, graphs can be prepared showing the average taper and volume of the trees in any stand where the average heights of the various diameter classes are known.—*G. A. Pearson.*

462. Rupp, G. **Tabak-Ersatzmittel. [Tobacco substitutes.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 370–377. 1919.—See Bot. Absts. 4, Entry 121.

463. Sammereyer, H. **Waldschutz. [Forest protection.]** Oesterreich. Forst- u. Jagdzeitg. 1924: 302. Nov., 1919.—Under conditions following the war the necessity of forest protection in Austria has become acute. The author proposes a popular association (Völker bund) composed of all classes of society including urban as well as rural representatives to secure recognition of the necessity of forest conservation and protection.—*F. S. Baker.*

464. Scalione, C. C., and D. R. Merrill. **The tannin content of redwood.** Jour. Indust. Eng. Chem. 11: 643–644. 1919.—Heartwood of redwood contains 12.2 per cent of tannin with the A. L. C. A. hide powder method. Sapwood and bark contain very little tannin.—*Henry Schmitz.*

465. Schrage. **Aus dem Leben verkannter Tiere. [On the life and habits of misunderstood animals.]** Zeitschr. Forst- u. Jagdw. 51: 190–201. 1919.—Article deals with the life history of the mole. It was long believed that the mole was a beneficial animal in that he was supposed to eat the grub of the May beetle which is so destructive to forest tree seedlings. Accordingly the mole was introduced in regions where the beetle was doing much damage. But no beneficial results were obtained.—Investigations were therefore conducted to determine if the mole really did eat beetle grubs. Feeding experiments conducted on captured moles proved that they do not eat the grubs but subsist rather on angle worms. The moles refused to eat grubs even when almost starved. To protect the mole because he is supposed to be an aid to the forester and farmer is therefore a false opinion.—*Hermann Krauch.*

466. Schroder. **Bodenpflege durch Reisigdeckung. [Soil maintenance by means of scattering brush.]** Deutsch. Forstzeitg. 34: 162–163. 1919.—Removal of leaf-litter under stands of hardwood species (beech oak, ash), either by erosion, by wind, or otherwise, results in a hardening of the surface soil (especially on heavy soils) which is usually soon covered with a matted vegetation of Polytrichum or other moss. These conditions seriously affect the growth of the forest. To hold the leaf-litter in place, the smaller branches resulting from logging operations were scattered over the ground. Examination 6 years later showed a heavy cover of leaves, no moss, and surface soil free from crust, in sharp contrast to nearby areas not so treated.—*W. N. Sparhawk.*

467. Schwappach, A. **Neure Untersuchungen über den Wachstumsgang der Scwarzerlen-Bestände. [New investigations concerning the growth and yield of black alder.]** Zeitschr. Forst-u. Jadgw. 51: 184–190. 1919.—A detailed citation, (with tables) of the changes in yield from the period 1902 to 1918.—*Hermann Krauch.*

468. Schwappach. **[Rev. of: Denkschrift, betreffend die Hedung und Sicherung der forstlichen Rohproduction in Oesterreich nach dem Kriege. [Memoir on increasing and assuring the forest production in Austria after the war.]** Zentralbl. Gesamte Forstw. 1918: 236.] Forst. Rundschau 20: 9–12. 1919.—Summary of 15 points presented to the Minister of Agriculture (Austria) by the directors of the Austrian Forest Association, covering recommen-

dations on reforestation, improved forest engineering, recognition of importance of small private forest holdings, better education for foresters and forest investigations particularly in lines of silviculture, utilization, seed studies, and smoke damage.—*F. S. Baker.*

469. Schwappach. [Rev. of: **8 papers on forest education in Germany.** Allgem. Forst-u. Jagdzeitg. 94: 34, 85, 86, 88, 95, 1918; Forstwiss. Zentralbl. 40: 244. 1918; Tharandter Forst. Jahrb. 69: 135, 268, 320, 321, 359. 1918.] Forst. Rundschau 20: 1–7. 1919.—The discussion centers upon the rôle of the forest colleges (forstliche Hochschulen) in the scheme of forest education, particularly in view of the reduction in the number of schools necessitated by the results of the war. The general opinion seems to be that the colleges should be abandoned as such and merged into existing academies, technical schools or universities.—*F. S. Baker.*

470. Sharples, P. P. **Trees and the highways.** Amer. Forestry 25: 1415–1416. *3 fig.* 1919.

471. Shepstone, H. J. **Water tree of the Sudan.** Sci. Amer. 121: 260, 272. *2 fig.* 1919. —The Tebeldi tree or "Baobab" of the Sudan, *Adansonia digita,* attains a height of 50 to 55 feet and an average diameter of 16 feet, maintaining the latter to a height of 25 feet or more. The trunks are by nature hollow, and they are used by the natives to store water for use in the dry season. Water thus stored remains sweet for a very long time, and even after a lapse of two years only a slight discoloration is noticeable. From the bark the inhabitants make strong and serviceable ropes. The kernels of the peculiar fruit may be crushed, mixed with water and then boiled and eaten. The age of the large trees is probably great, running into centuries.—*Chas. H. Otis.*

472. Sieber, P. **Über Holzartenwechsel. [Suggestions regarding change of species in silvicultural practice.]** Allg. Forst-u. Jagdweitg. 95: 1–6. 1919.—It has often been observed in the virgin forest that there occur periodic changes of composition amongst the various tree types. This change is ascribed to the depletion of the soil of certain elements peculiar to the species which occupy a given site for a long time—hence a change to species of different requirements follows. Since the introduction of forestry practice centuries ago, it became the aim, in most instances, of foresters to convert the mixed stands into single species forests. Now it has become apparent that this continuous cropping to one species has been detrimental and that an actual decrease in yield is resulting. The article outlines the means and methods for managing the forests so that mixed stands may be again introduced and maintained.—It is pointed out that that silvicultural system is best which makes use of the observations gathered from nature. There has been too much tendency to make the forests conform to a prescribed "system" with the result that they have deteriorated.—*Hermann Krauch.*

473. Sim, T. R. **Soil erosion and conservation.** South African Jour. Indust. 2: 962–968. 1919.—See Bot. Absts. 4, Entry 1686.

474. Simmonds, J. H. **Private forestry.** New Zealand Jour. Agric. 19: 152–171. *10 pl.* 1919.—Several sections of the Marlborough District were studied to determine the relative values of comparatively old tree plantations in that area. The trees are considered from the standpoint of usefulness as shelter for the homestead or the farm, and general effect on the country side; value as fuel, fencing, and sawn timber; suitability for any given location; and methods of propagation. The species are listed in groups according to probable adaptability for the different types of soil and climate.—*N. J. Giddings.*

475. Skerrett, R. G. **The silkworm's formidable competitor.** Sci. Amer. 121: 458. *4 fig.* 1919.—Spruce pulp is the fundamental material from which viscose silk (artificial) is manufactured.—*Chas. H. Otis.*

476. Tiemann, Harry D. **The phenomena of drying wood.** Jour. Franklin Inst. 188: 27–50. *Fig. 1–8.* 1919.—The physical processes by which water escapes from wood in the process of drying are not discussed, but the chemical and anatomical features of the wood are

summarized. Water occurs as liquid in the cells and vessels and as imbibed or hygroscopic moisture in the walls. The latter, at the "fiber saturation point," is generally about 25–30 per cent calculated upon the dry weight of the wood. "Casehardening," which is the drying and setting of the outer cell walls before these within the wood have dried out, is a frequent phenomenon. Shrinkage is the result of the drying out of imbibed water and is about twice as much circumferentially as radially and one fiftieth as much longitudinally. Due to the special properties of wood, drying is complicated by the four factors, moisture, shrinkage, stresses and hardening and cannot be calculated simply in terms of the number of thermal units necessary to eliminate all moisture. The slow rate of transfusion of moisture, the irregular rates of shrinkage, the frequent softening of wood substance or the loss of cohesion among the fibers, at elevated temperatures, the warped condition of wood fibers, the influence of elevated temperature combined with various degrees of moisture, the brittleness of wood caused by excessive drying, and its hygroscopic character, the color changes and the collapse of cells—all these help to cause internal stresses "which are the main cause of warping, checking and honey-combing." These stresses may be temporary or permanent depending upon the "relative degree of hardening of the outer and inner fibers and the relative amounts of residual shrinkage when they become uniformly dry." The internal fibers may be pulled apart by the internal stresses, thus giving rise to "honey-combing." Casehardening generally increases with rapid drying out and is less with a slower rate, since the transfusion of moisture keeps more nearly abreast of evaporation. The stresses for "several assumed progressve conditions of casehardening and reabsorption" are analyzed in terms of the relative compressions and stretchings of the outer and the inner layers of fibers, showing that the "maximum total stresses are very apt to occur in the first stages of drying" and that "the tension inside the block is at no time as intense as on the surface."—*Ernest Shaw Reynolds.*

477. Walker, H. C. **Forest policy in Burma.** Indian Forester 45: 173–187. 1919.

478. Waterson, D. **Vanishing forests.** Sci. Amer. 121: 383. 1919.—A brief consideration of forest conditions in New Zealand.—*Chas. H. Otis.*

479. Waterson, D. **White pine and butter.** Sci. Amer. 121: 372. 1919.—Describing a tub made of two thicknesses of veneer $\frac{1}{16}$ inch thick and used in New Zealand and Australia as a butter container.—*Chas. H. Otis.*

480. Watkins, J. R. **Pitch pockets and their relation to the inspection of airplane parts.** Jour. Franklin Inst. 188: 245–253. *Fig. 1–3.* 1919.—The theories concerning the origin of resin pockets and their effects upon airplane timber are discussed. The injury to such timber varies with the size and position of the pockets, the smaller ones apparently not materially weakening the airplane parts.—*Ernest Shaw Reynolds.*

481. Weber, H. **Zur künftigen Besteurung des Waldbesitzes. [Future taxation of forest land.]** Allg. Forst- u. Jagdzeitg. 95: 25–32. 1919.—The war, and its results have made it necessary to levy extraordinary taxes on all forms of property and incomes. Owing to the peculiar nature of the forest as an investment it is difficult to make proper assessment of value and corresponding tax. It is extremely important however that care be taken to enact the right kind of laws governing taxation of forest property. Otherwise, great if not irreparable damage might be done as a result of overcutting in order to meet the tax demands. The writer outlines, in some detail, a system of taxation which he thinks will help to solve this important problem.—*Hermann Krauch.*

482. Weir, James R., and Ernest E. Hubert. **A study of the rots of western white pine.** U. S. Dept. Agric. Bull. 799. *24 p.* 1919.—See Bot. Absts. 4, Entry 1379.

483. Wibeck, Edvard. **Om tall- och granfrö frå Norrland. [Concerning pine and spruce seed from Norrland (Sweden).]** Skogen 6: 97–107. *Fig. 1–3.* 1919.—The importance of the source of seed for reforestation as disclosed by previous investigations and experiences is

pointed out. As a rule seed should not be taken from a region of relatively mild climate to one of more severe climate. Experimental plantations show a variation in number of good plants of from 1 per cent to 76 per cent for seed from different localities. A difference of 1°C. in mean annual temperature, or 200 meters in altitude is sufficient to show a marked effect upon the development of plants from a given lot of seed. The pine (*Pinus sylvestris*) requires a mean temperature of 10° to 11°C. from June to August inclusive to produce germinable seed. In the extreme northern range and in high altitudes this temperature is seldom attained, with the result that the forests are irregular and many-aged. The country is divided into regions according to the average germination of pine seed, which corresponds closely to the mean June-August temperature. Seed of the highest viability is produced when the mean June-August temperature is 13°C. Pine seed often shows a higher germination per cent after it has been stored 1 or 2 years. The spruce (*Picea excelsa*) produces germinable seed in a mean June-August temperature, about 1°C. lower than that required by pine. Since the spruce is relatively independent of temperature, no definite relation between viability of seed and climatic factors have been found.—*G. A. Pearson.*

484. Wimmenauer, K. **Wachstum und Ertrag der Esche. [Growth and yield of ash.]** Allg. Forst- u. Jagdzeitg. 95: 9–17. 1919.—Article is one of series, to be concluded in February number of this journal. Detailed results (tables) based on sample plot investigations.—*Hermann Krauch.*

GENETICS

George H. Shull, *Editor*

James P. Kelly, *Assistant Editor*

485. Adametz, L. **Über Wesen und Ursprung der Domestikationsmerkmale bei Mensch und Tier. [The existence and origin of marks of domestication in man and animals.]** Sitzungsber. anthropol. Ges. Wien 48: 4–9. 1918.—Author discusses the various physical and mental characteristics, largely of a degenerative nature, which tend to appear among animals under domestication and in the human race which he holds is living under similarly unnatural conditions.—*Sewall Wright.*

486. Allen, C. E. **The basis of sex inheritance in Sphaerocarpos.** Proc. Amer. Philos. Soc. 58: 289–316. *28 fig.* 1919.—Few small counts from separately sown tetrads suggest that 2 spores of tetrad develop male, other two female gametophytes. Female shows 8 chromosomes, 1 (X) distinctly larger; male 8, 1 (Y) inconspicuous; sporophyte about 16, just 1 (X) distinctly larger. Heterotypic division not seen; homotypic shows X present in 1 spindle, absent in other. Novel mechanism, for diploid generation (asexual) is regularly heterozygous. X, due to greater bulk, brings "vigor" in female gametophyte, male being much smaller (consisting of fewer, not smaller, cells). "Quantitative theory" of sex determination is "impossible of application" in *Sphaerocarpos,* for sex individuals show no trace of opposite sex characters.—*Merle C. Coulter.*

487. Alverdes, F. [German rev. of: Bonnevie, Kristine. **Polydaktyli i norske bygdeslegter. (Polydactyly in Norwegian peasantry.)** Norsk Mag. f. Lägev. 6: 1–32. 1919. (See Bot. Absts. 4, Entry 3314.)] Zeitschr. indukt. Abstamm. Vererb. 22: 142–143. Jan., 1920.

488. Alverdes, F. [German rev. of: Bonnevie, Kristine. **Om tvillingsfödslers arvelighet. Undersökelse över en norsk bygdeslegt. (On the inheritance of twin births. Investigations on Norwegian peasantry.)** Norsk Mag. f. Lägev. 8: 1–22. 1919. (See Bot. Absts. 4, Entry 3315.)] Zeitschr. indukt. Abstamm. Vererb. 22: 143–144. Jan., 1920.

489. Anonymous. **Old age in perennial plants.** Gard. Chron. 66: 190. Oct. 11, 1919.—Refers to the discovery of H. M. Benedict (Cornell Agric. Exp. Sta. Mem. 7, 1915) that the wild grape (*Vitis vulpina*) and certain other woody perennials with increasing age have correspondingly closer-meshed veins in their leaves, a condition which is regularly propagated by cuttings.—*John Belling.*

490. Anonymous. **Mendelism in relation to horticulture.** Gard. Chron. 66: 215. Oct. 25, 1919.—Report of a lecture by J. A. Thomson. He stated that, through Mendelian experiments with wheat, the increased yield in India had been very great; while a value of several millions has been added to the productivity of Canada.—*John Belling.*

491. Anonymous (Student). **An explanation of deviations from Poisson's law in practice.** Biometrika 12: 211–215. Nov., 1919.—This paper attempts to explore the general question of what effect various departures from the conditions which lead to Poisson's Law have on the resulting statistics, and especially which conditions lead to positive and which to negative binomials. It is shown by mathematical analysis that in those populations which might be expected to follow Poisson's law: (1) they will do so if the only deviation from the ideal conditions is that the chance of different individuals falling into the same divisions are not equal, as long as these chances are all small; (2) if in addition to this the chances of some individuals are large, a positive binomial will fit the results better than the exponential; (3) if the different divisions have different chances of containing individuals, as is most often the case in many statistics, a negative binomial will fit the results better than the exponential except so far as (2) may interfere; (4) if the presence of one individual in a division increases the chance of other individuals falling into that division, a negative binomial will fit best; but if it decreases the chance, a positive binomial will fit best.—*John W. Gowen.*

492. Anonymous. **Inheritance investigations in swine.** Kansas Sta. Rept. 1918: 42–43. 1918.—Greater width of forehead in Berkshire is dominant over lesser forehead widths of Duroc Jerseys, Tamworths and the wild hog. Straight face of Tamworth is dominant over dish face of Berkshire. Tamworth long face is dominant over Jersey short face. Erect ear of Berkshire is dominant over drooping ear of Duroc Jersey.—*H. L. Ibsen.*

493. Anonymous. **Improvement and conservation of farm poultry.** Kansas Sta. Rept. 1918: 43–45. *1 fig.* 1918.—Standard bred males from high-producing strains of Barred Plymouth Rocks, single-comb White Leghorns, and White Orpingtons have been used in grading up mongrel flocks. The third-generation grade females in the case of the Plymouth Rocks and White Leghorns show marked increase in average first-year's production of eggs as compared with their mongrel great granddams. White Orpingtons show slight decrease. Check pen of mongrels showed slight increase.—*H. L. Ibsen.*

494. Anonymous. **Inheritance of color in Andalusian fowl.** Kansas Sta. Rept. 1918: 45. 1918—Four factors seem to be responsible for feather color of Blue Andalusians: "(1) black pigment; (2) a restrictor of black pigment which makes it appear bluish gray; (3) an extender which carries pigment to all feathers of the body, and (4) lacing, which is responsible for the black edging of many of the contour feathers of both males and females."—*H. L. Ibsen.*

495. Anonymous. **Discoveries in China, useful in California.** California Citrograph 3: 49–50. *1 fig.* Jan., 1918.—On new fruits; includes paragraph on plant breeding (selection) by Chinese farmers.—*Howard B. Frost.*

496. Anonymous. [Editorial.] **Tree records important.** California Citrograph 3: 69. Feb., 1918. Records of yields urged, in relation to bud variation.—*Howard B. Frost.*

497. Anonymous. [Editorial.] **Bud selection wins again.** California Citrograph 3: 121. Apr., 1918.—Prize-winning pomelos credited to bud selection.—*Howard B. Frost.*

498. Anonymous. **The elimination of poor citrus strains.** California Citrograph 3: 224. July, 1918.—Brief, popular.

499. Anonymous. [Editorial.] **Why trees did not bear.** California Citrograph 4: 257. Aug., 1919.—History of a case of budding to an inferior strain of orange, quoted from A. D. Shamel.—*Howard B. Frost.*

500. Anonymous. **The protection of raisers of new plants.** Gard. Chron. 66: 226. Nov. 1, 1919.—Raisers of new plants do not reap the just reward of their labor. The finders of fortuitous novelties need not be considered. The selectors of improved strains have as much right to recompense as the originators of the strains they improve. Some novelties, such as new apples, could not be rightly judged for several years. There are many objections to the patenting of plant novelties, and some to the registration of names of strains as trademarks.—*John Belling.*

501. Anonymous. **Genetica.** Zeitschr. Pflanzenzücht. 7: 75. June, 1919.—Editorial notice of the Dutch journal, "Genetica."—*Geo. H. Shull.*

502. Anonymous. **Ungarische Pflanzenzucht-Aktien-Gesellschaft. [Hungarian plant-breeding company.]** Zeitschr. Pflanzenzücht. 7: 74–75. June, 1919.—Announces the establishment of a corporation for the purpose of breeding and disseminating superior varieties of all the important agricultural crop-plants suited to the special conditions of each section of Hungary. Main office of the corporation is in Budapest.—*Geo. H. Shull.*

503. Anonymous. **Dairy cattle breeding experiments.** Hoard's Dairyman 57: 544, 545. *3 fig.* 1919.—Outline of plan to study transmission of economic dairy characters such as milk yield, percentage and color of butter-fat, fertility, vigor, etc. Plan involves inbreeding, line-breeding, and out-crossing, using pure breeds as the foundation stock.—*J. A. Detlefsen.*

504. Anonymous. **Agricultural research in Australia.** Advis. Council Sc. and Ind. Commonwealth of Australia Bull. 7. 1918.

505. Anonymous. **Philip Reginald Gregory.** Bot. Soc. and Exchange Club, British Isles. Rept. 1918. 5: 356. July, 1919.—Brief biographical sketch.—*G. H. Shull.*

506. Anonymous (A. H. C.) [Rev. of: Bower, F. O., J. G. Kerr, and W. E. Agar. **Lectures on sex and heredity delivered in Glasgow, 1917–18.** *16 mo. vi + 119 p.* Macmillan Co.: London, 1919.] Jour. Botany 57: 287–288. 1919.

507. Anonymous. [Rev. of: Lillie, F. R. **The problem of fertilization.** *278 p.* University Chicago Press: Chicago, 1919.] Trans. Amer. Microsc. Soc. 38: 246–258. July, 1919.

508. Anonymous. [Rev. of: Macfarlane, J. M. **The causes and course of evolution.** *875 p.* Macmillan Co.: New York, 1918.] Trans. Amer. Microsc. Soc. 38: 259–261. July, 1919.

509. Anonymous. [Rev. of: Moore, Carl R. **On the physiological properties of the gonads as controllers of somatic and psychical characteristics. I. The rat.** Jour. Exp. Zool. 28: 137–160. *5 fig.* May 20, 1919.] Trans. Amer. Microsc. Soc. 38: 237–238. July, 1919.—See Bot. Absts. 3, Entry 1498.

510. Anonymous. [Rev. of: Popenoe, Paul, and Roswell H. Johnson. **Applied eugenics.** *14 × 20 cm., v + 459 p., 46 fig.* Macmillan Co.: New York, Oct., 1918.] Trans. Amer. Microsc. Soc. 38: 258–259. July, 1919.—See Bot. Absts. 3, Entry 279.

511. Anonymous. [E.] [Rev. of: Stark, P. **Die Blütenvariationen der Einbeere. (Floral variations of Paris quadrifolia.)** Zeitschr. indukt. Abstamm. Vererb. 19: 241–303. *35 fig.* Aug., 1918. (See Bot. Absts. 3, Entry 2201.)] Bot. Jahrb. 55: 60. 1919.

512. Anonymous. [Rev. of: Stoll, Norman R., and A. Franklin Shull. **Sex determination in the white fly.** Genetics 4: 251–260. May, 1919. (See Bot. Absts. 3, Entry 1516.)] Trans. Amer. Microsc. Soc. 38: 292. Oct., 1919.

513. Anonymous. [Rev. of: Sumner, F. B. Continuous and discontinuous variations and their inheritance in Peromyscus. I, II, III, Amer. Nat. 52: 177–208, 290–300, 439–454. 1918.] Trans. Amer. Microsc. Soc. 38: 238–239. July, 1919.—See Bot. Absts. 1, Entries 245, 943.

514. Bach, Siegfried. Noch ein Bastardierungsversuch Pisum × Faba. [Another hybridization experiment Pisum × Faba.] Zeitschr. Pflanzenzücht. 7: 73–74. June, 1919.—See Bot. Absts. 4, Entry 2172.

515. Bach, Siegfried. Zur näheren Kenntnis der Faktoren der Anthozyanbildung bei Pisum. [To a more exact knowledge of the factors for the formation of anthocyan in Pisum.] Zeitschr. Pflanzenzücht. 7: 64–66. June, 1919.—See Bot. Absts. 4, Entry 2173.

516. Ballard, W. R. Notes on geranium breeding. Proc. Amer. Soc. Hortic. Sci. 15: 62–65. 1918.—A brief description is given of several varieties of geraniums; "the geranium" of the garden not being a true *Geranium* but of the genus *Pelargonium*, probably derived from *P. zonale* and *P. inquinans*. The Snow, or Lady Washington, apparently descended from *P. cucullatum* and *P. angulosum*. The scented-leaved type is probably *P. pellatum*. In a study of resistance to a leaf and stem spot disease many types were found resistant when leaves are protected from rain. Disease resistance and flower characters are difficult to combine by breeding. Many seedlings exhibit increased vigor for several years, but degenerate. A list of crosses of like and different flower types shows singleness to be dominant. The nectar tube adnate to the flower stem in the true genus *Geranium*, is not constant in the zonal group and does not appear in the double flowers of any cross. It is apparently correlated with singleness. Species crosses are difficult and where possible the plants are not very fertile.—*M. J. Dorsey.*

517. Banta, A. M. The results of selection with a Cladocera pure line. Proc. Soc. Biol. and Med. 16: 123–124. 1919.—Attempts to obtain by selection diversities with respect to reactiveness to light within parthenogenetic pure lines (clones) of three species of *Cladocera* were positive in one line of *Simocephalus vetulus*. Averages for two-month periods were made for 54 months during which 181 generations were obtained. Considerable fluctuation in reactiveness was noted but in course of time the mean for the plus strain decreased to one-half and finally to one-third that of the minus strain. Diversities in reactiveness were not due to differences in vigor.—*R. W. Hegner.*

518. Baumann, E. Zur Frage der Individual- und der Immunitätszüchtung bei der Kartoffel. [On the question of individual selection in potatoes and the breeding for immunity.] Fühl. Landw. Zeitg. 67: 246–253. 1918.—See Bot. Absts. 4, Entry 1239.

519. Beauverie, J. The present state of the study of anthocyanin. Rev. Gén. Sci. 29: 572–579. *1 fig.* 29: 604–612. 1918.—A review of the work on anthocyanin,—its distribution and its chemical, physiological, cytological and genetical status. The genetic treatment is very brief, dealing mostly with the work of Keeble and Armstrong and Miss Wheldale.—*E. W. Lindstrom.*

520. Benders. [Dutch rev. of: De Wilde, P. A. Verwantschap en Erfelijkheid bij doofstomheid en retinitis pigmentosa. (Relationship and heredity in deaf-and-dumbness and retinitis pigmentosa.) Diss. Amsterdam. 1919.] Genetica 2: 90–91. Jan., 1920.

521. Bielschowsky, Max. Entwurf eines Systems der Heredodegenerationen des Zentralnervensystems einschliesslich der zugehörigen Striatumerkrankungen. [Suggestion of a system of hereditary degenerations of the central nervous system inclusive of the associated diseases of the striatum.] Jour. Psychol. Neurol. 24: 48–50. 1918.—Author expresses opinion that the underlying cause of many diseases involving the corpus striatum is a defective germplasm, and that even in certain cases where similar ancestral manifestations are not demon-

strable suspicion of hereditary degeneration is justified. A clinical classification is proposed for the better known hereditary forms of cerebral degeneration, but at the same time it is pointed out that the student of these conditions does not deal with sharply defined entities, since it is quite unusual, except among relatives, to find two cases that agree in all respects.—*C. H. Danforth.*

522. Blakeslee, A. F. **Plant genetics.** [Rev. of: Coulter, John M., and Merle C. Coulter. **Plant genetics.** *13 × 19 cm., ix + 214 p., 40 fig.* Univ. Chicago Press: Chicago, July, 1918.] Plant World 22: 181–182. June, 1919.—See Bot. Absts. 2, Entry 395.

523. Blaringhem, L. **Les problèmes de l'hérédité expérimentale. [The problems of experimental heredity.]** *12 × 19 cm., 317 pages, 20 fig.* 1919.—Author presents various kinds of facts of heredity and offers classification of them; he intentionally omits characters recently acquired and not yet fixed, and also mutational phenomena; he takes special account of work of French hybridizers of the 19th century whom he thinks modern geneticists have neglected. The work is divided into three sections, dealing respectively with "normal heredity," species hybridization, and varietal crossings.—Section 1. After general discussion of the meaning of *purity* among living things author defines "pure line" giving it not only a genealogical concept but also one in which no divergent individuals may be included. Advantages of barleys for pure-line studies are emphasized. Hereditary phenomena to be observed when individuals of the same pure line are parents is named *normal heredity* and proofs of transmission of qualities of ascendants to descendants is here so evident that their investigation offers little attraction. If qualities of parents deviate from the mean of the line, progeny are expected to show regression and there arises what the author names "fluctuating heredity;" this occurs with continuous characters and is studied by biometrical methods. A sympathetic presentation of laws and formulae of regression, ancestral inheritance and of father-son correlation is given. Author regrets application of biometrical methods to discontinuous characters, as eye color, and points out that Mendelian heredity has given better account; he also deems it premature to apply them to psychological traits.—Section 2. Author asserts his belief in genetically permanent blends following on some hybridizations and takes exception to the idea of multiple factors with segregation. Examples of blending (hérédité mixte) often occur in crossings of species, even elementary species, where more or less sterility occurs in first generation. Mendel's laws are thought not to hold in these cases. Author conceives of combination in chemical sense, of certain cell elements, followed by expurgation or refining which leads to stabilization and increased fertility. He believes this process explains in part the diversity of species and genera. He gives the origin of *Aegilops speltaeformis* as a case of such permanent blend resulting from crossing of wheat and *Aegilops ovata.* Other cases cited are skin color in human beings, rabbit-hare hybrids, and *Cavia* species crosses.—This section treats also of "mosaic heredity," whose characteristics were set forth by Naudin about 1859 (hence also designated Naudinian heredity) on the basis of results of crossing *Datura stramonium* and *D. laevis*, former with spiny and latter with smooth capsules. Three of the 40 F_1 hybrids bore "composite" capsules [chimaeras], partly spiny and partly smooth, the extent of smoothness being greatest in the youngest capsules. These were interpreted by Naudin as the disengaging of two species forcibly united. Author's own work on barleys is cited in support of the existence of mosaic heredity; 14 of 17 hybrids of a certain cross uniformly exhibited spiny-nerved glumes, the remaining 3 exhibited mosaic behavior with individual heads bearing spiny, spineless and intermediate condition, with spineless glumes typically more frequent at base and tip of heads. The progeny of such smooth-glumed grains may not show smoothness again and spiny grains did not always give offspring uniformly spiny; this leads author to suppose independence between traits separated out (dissociés) on glumes and character of embryos enclosed by the glumes. The appearance of such mosaics is considered an indication of profound difference between lines united by hybridization. This somatic separation of characters occurs without precise rules but tends to show at extremities of the axes or in late buds. Section 2 discusses lastly "unilateral heredity." Species of *Fragaria* are cited as more or less subject to unilateral transmission. Author

upholds as reliable Millardet's publication (1894) on strawberry hybridizations. In one cross resulting in 15 F_1 plants 14 resembled the pistillate parent and 1 in its entirety the pollen parent. 53 F_2 descendants of the last maintained completely paternal appearance except for slight decrease in fruit size. Millardet found maternal characters more often transmitted in their entirety in these peculiar genetic phenomena named by the author unilateral heredity. 14 of Millardet's hybridizations gave 76 F_1 progeny of completely maternal type and in 224 F_2 descendants of latter maternal appearance was maintained in all except one individual. Millardet came to believe that this "false hybridization" was the rule in European *Fragarias.* Some *Fragaria* crosses, *e. g.*, *F. virginiana*, *F. chiloensis*, are said to yield "true hybrids" rather than "false hybrids." Certain other *Fragaria* species crosses failed and were interpreted as showing specific divergencies of the first degree. Researches by Solms-Laubach on strawberries, by Lidforss on *Rubus* species, and other investigations confirmatory of unilateral transmission, are described. Following Giard author infers that unilateral heredity is due to development of one or the other of gametes brought together in hybridization.—Section 3 considers the crossing of varieties, where alternate or Mendelian heredity occurs. Mendel's experiments and algebraic rules inferred from them are presented in much detail. The reasoning of the "Czech monk" as applied to results in *Pisum* are considered justified by concordance of observed and calculated figures. Number of characters following Mendel's laws is believed to be limited and author prophesies that the field of "hérédité mixte" will offer most in future. Crossings of barleys involving spiny and spineless glumes showed that when the parents are closely related the F_2 numbers agree with simple expectations based on Mendel's laws but that in hybridizations between divergent lines, the genetic behavior is different. Mention is also made of a line of Svalöf barley characterized by spinelessness (recessive trait) and which bred true on testing in moist fertile soils, but which gave a large percentage of more or less spiny grains in dry soils. Author believes this line to be a case of a "fixed hybrid" which was induced to segregate in dry soil. On Mendelian theory the spineless line should have contained no latent spiny condition. Classification of varieties is offered: (1) Varieties due to color differences; (2) Those due to degrees of hairiness or smoothness; (3) Those based on differences in consistency; (4) Stature differences; (5) "grave anomalies" as pelorias, fusions of organs, etc. Brief discussion under each heading of results of hybridization and cases thought to be non-Mendelian are presented. Author urges careful observing of fertility of hybrids to ascertain degree of specific distinctness in lines crossed.—Finally, various hereditary processes are compared to phenomena in realms of physics and chemistry,—continuity, equilibrium and center of gravity, dissociation, combination, substitution, juxtaposition. Author's attention is especially attracted by opposition of continuity and discontinuity in biology, corresponding to physical variations and chemical combinations.—*James P. Kelly.*

524. Bliss, A. J. **The protection of raisers of new plants.** Gard. Chron. 66: 278. Nov. 29, 1919.—The patenting of horticultural novelties is advocated. The breeder of a selected strain might obtain a patent for the improvement, and pay a royalty to the original raiser. Mere registration of names would multiply varieties excessively. [See also next following Entry, 525.]—*John Belling.*

525. Bliss, A. J. **The protection of raisers of new plants.** Gard. Chron. 66: 316. Dec. 20, 1919.—Suggests that, in the trade lists of members of the Chamber of Horticulture, the name of the raiser should be placed after the name of every new variety. The registration and testing of new varieties, and the weeding out of obsolete ones, might well be undertaken by the Royal Horticultural Society. Thinks raisers of patented novelties might be required to give pedigrees, not necessarily for immediate publication. [See also next preceding Entry, 524.]—*John Belling.*

526. Bower, F. O. **Botany of the living plant.** *15 × 22 cm., vii + 580 p., 447 fig.* Macmillan & Co.: London, England. 1919.—Chapter 31, pp. 461–477, gives very elementary discussion of these topics, describing and illustrating mitotic division, particularly the reduction division and the resultant independent groupings of the chromosomes. The brief state-

ment of Mendelian heredity is taken from Punnett's Mendelism. "Mendelian segregation is not in itself a constructive process. It is a distributive agency. . . . . The central question of evolution comes finally to be the origin of the heritable mutations. Of this as little is positively known at the moment as the constitution of the protoplasm that gives rise to them."—*Geo. H. Shull.*

527. Bower, F. O., J. G. Kerr, and W. E. Agar. Lectures on sex and heredity delivered in Glasgow, 1917–18. *16 mo., vi + 119 p., 49 fig.* Macmillan Co.: London. 1919.

528. Brierly, W. B. Some concepts in mycology—an attempt at synthesis. Trans. British Mycol. Soc. 6: 204–235. 1919.—See Bot. Absts. 4, Entry 1061.

529. Calkins, Gary N. Uroleptus mobilis Engelm. II. Renewal of vitality through conjugation. Jour. Exp. Zool. 29: 121–156. *1 fig., 1 diagram.* Oct. 5, 1919.—In his second contribution on *Uroleptus mobilis* author finds that the protoplasm of a single specimen and its progeny exhibit a progressive decrease of vitality (as measured by fission rate) and final death if conjugation and endomixis (parthenogenesis) is prevented. In his experiments, conjugation was prevented by the maintenance of isolation cultures. Endomixis was known not to take place because no specimens encysted in these isolation cultures, and in this species, endomixis takes place only at a time of encystment. The results of the paper indicates clearly that a restoration of full metabolic activity follows the conjugation of two closely related individuals of one of these "degenerated" lines. In regard to the effect of encystment and its accompanying asexual reorganization, author believes that, "so far as the evidence thus far obtained is concerned, it appears that the initial vitality after encystment and parthenogenesis is as great as, or even greater than, that after conjugation." It is not known, however, whether this high potential is as enduring as that obtained from conjugation. —*W. H. Taliaferro.*

530. Carle, E. Premiers travaux sur la sélection des riz du laboratoire d'étude des céréales à Saigon. [First work in selection of rice at the Saigon laboratory for the study of cereals. Bull. Agric. Inst. Sci. Saigon 1: 74–87. 1919.

531. Carrier, L. A reason for the contradictory results in corn experiments. Jour. Amer. Soc. Agron. 11: 106–113. 1919.—Author's purpose is to show that the common methods of variety testing and related field experimentation with maize are unreliable on account of xenia effect upon size and weight of kernel through cross-pollination. The author's own experiments in planting separately seed of several different strains of certain varieties as compared with mixed lots of seed of these same strains indicate a marked increase in yield from the mixed planting, the result being attributed to this xenia effect. This is supported by experimental evidence of certain other investigators. The author recommends for practice that farmers select their seed corn after the well established types of their respective locality introducing occasionally seed of same variety, but from an unrelated strain brought in from an outside source.—*L. H. Smith.*

532. Castle, W. E. Does evolution occur exclusively by loss of genetic factors. Amer. Nat. 53: 555–558. Nov.–Dec., 1919.—A recent statement of belief by Duerden (Amer. Nat. 53: 312) that selection can be effective only in the direction of degeneration of a character, made in connection with wing and toe characters of the ostrich, is criticized by the author. Among other considerations, the latter cites his successful use of selection both in increasing and in decreasing the amount of white in hooded rats and in recovering an ancestral fourth toe on the hind feet of guinea-pigs.—*Sewall Wright.*

533. Castle, W. E. The rôle of selection in evolution. An agency for the elimination of variations. Sci. Amer. Supplem. 87: 66–67, 90–91. 1919.—Selection as a factor in evolution is discussed and its relation to various theories analyzed. No real diversity of views regarding selection exists, but only concerning nature of material upon which it works. Author

holds that selection is effective in pure lines, at least in some cases.—Genes vary in stability, some yielding to selection much more readily than others. From results of experimental breeding, author comes to the belief that selection can cause further variability. Opinion is expressed that selection is the most reasonable explanation of evolution. However, it cannot institute new lines of variation but acts in modification of existing types and in direction in which variations tend.—*E. Roberts.*

534. Castle, W. E. **Inheritance of quantity and quality of milk production in dairy cattle.** Proc. Nation. Acad. Sci. (U. S.) 5: 428–434. Oct., 1919.—The material presented is that collected in Bowlker's herd of F_1 and F_2 cows from crosses of pure-bred Holstein-Friesian and Guernsey animals reciprocally mated.—Mass methods are used throughout the paper. Of 31 F_1 cows at ages ranging from $2\frac{1}{6}$ to $3\frac{1}{3}$ years with milk yield over 7- to 12-months periods, the average milk production was 6612 pounds of milk, 4.08 per cent butter fat and 270 pounds butter fat in the first lactation. The second lactation average was 8663 pounds of milk and 363 pounds of butter fat.—The data for pure-bred Holstein-Friesian herd (25 cows) ranged in age from $2\frac{1}{2}$ to $3\frac{1}{3}$ years and in the length of lactation from $8\frac{1}{2}$ to 12 months. In the first lactation the averages were 7673 pounds of milk and 3.4 per cent butter fat (on 8 cows) and 261 pounds of butter fat (on 8 cows). The second lactation, age range $3\frac{1}{2}$ to $4\frac{1}{2}$ years, length of lactation $7\frac{1}{2}$ to 12 months, average for milk 9475 pounds and butter fat 322 pounds. The Guernsey herd (8 cows) ranged in age from $2\frac{1}{3}$ to 3 years, length of lactation $7\frac{1}{2}$ to 12 months, and average in milk 4617 for first lactation and for the second 5593 pounds.—No correction for increased milk yield with age is made other than that of averaging the parental and F_1 herd's milk production.

Comparison of these average milk yields shows that of the F_1 herd to be 1061 pounds of milk less than the average yield of the pure Holsteins, but 1995 pounds more than the average yield of the pure Guernseys. The average butter-fat percentage content indicates an average butter-fat content of 4.08 per cent, which is slightly less than intermediate between the 3.4, the butter-fat percentage of the pure Holsteins and 5.0, the butter-fat percentage of the pure Guernsey. In those F_1 cows which have a second lactation the approach to the higher milk yield of the pure Holstein-Friesian is even more striking.—In butter-fat production (milk yield × butter-fat percentage) the Holsteins averaged 322 pounds, the Guernseys 280 pounds, the F_1 363 pounds.—These results seem to be considered as due to an increased vigor of the F_1 hybrids due to the out-cross.—Comparisons were made of the milk yield and butter fat of F_1 cows coming from the cross Holstein cow × Guernsey bull and its reciprocal. The milk yield and butter fat were found to be approximately equal in the two crosses, variations occurring in both directions. From this the conclusion is made, that it seems unlikely that any sex-linked factors are concerned in the case.—*John W. Gowen.*

535. Castle, W. E. **Are genes linear or non-linear in arrangement?** Proc. Nation. Acad. Sci. [U. S.] 5: 500–506. Nov., 1919.—Rebuttal to criticisms made by Morgan and his associates to conclusions of a former paper by Castle on same subject. Position taken by Castle and here reaffirmed is (1) that forces linking genes together are possibly molecular rather than mechanical; (2) reconstruction of sex-chromosome data of Morgan and Bridges proves arrangement cannot be linear; (3) values of crossovers greater than 50 per cent necessitated by linear hypothesis have never been observed and are logically impossible; (4) non-linear hypothesis is simpler because it eliminates secondary hypothesis needed on linear hypothesis to harmonize greater with lesser crossover values, particularly the hypothesis of double crossing over. Little new data are presented in this discussion, attention being devoted chiefly to extensions and further exposition of material presented previously in support of above propositions.—*John W. Gowen.*

536. Chace, E. M., and C. G. Church. **Notes on California and Arizona grapefruit.** California Citrograph 3: 200–201. *5 tables, 2 diagrams.* July, 1918.—On maturing and composition of fruit; includes analyses of nine "off types" of Marsh pomelo, in comparison with "standard types," showing inferiority of certain bud-variation strains.—*Howard B. Frost.*

537. Chamberlain, C. J. **Chondriosomes in plants.** [Rev. of: Mottier, D. M. **Chondriosomes and the primordia of chloroplasts and leucoplasts.** Ann. Botany 32: 191–214. *1 pl.* 1918.] Bot. Gaz. 67: 270–271. Mar., 1919.—See Bot. Absts. 4, Entry 169.

538. Chamberlain, C. J. **Cytology of gigantism.** [Rev. of: Tischler, G. **Untersuchungen über den Riesenwuchs von Phragmites communis var. pseudo-donax.** (Investigations of the gigantic growth of Phragmites communis var. pseudodonax.) Ber. Deutsch. Bot. Ges. 36: 549–558. 1918.] Bot. Gaz. 69: 192. Feb., 1920.—See also Bot. Absts. 3, Entry 1040.

539. Chittenden, Fred J. **Seedling potatoes.** Gard. Chron. 66: 264. Nov. 22, 1919.—Gives examples of seedling potatoes which, as far as could be determined by visible characters, were identical to varieties previously introduced. Raises question whether such phenotypically similar plants may not differ in other characters such as greater cropping power.—*Fred A. Krantz.*

540. Chopard, L. **Note sur un individu hermaphrodite de Clonopsis Gallica Charp. (Orth. Phasmidae).** [Note on a hermaphrodite specimen of Clonopsis gallica.] Bull. Soc. Zool. France, 43: 168–175, *4 fig.* 1919.—Author describes a specimen of phasmid, *Clonopsis gallica*, Charp. which exhibited both male and female characteristics, in part blended together, and in part separated asymmetrically. He discusses proposed explanations for the occasional occurrences of males and hermaphrodites in species which normally produce only parthenogenetic females. He inclines toward the view that unfavorable conditions are the cause.—*Sewall Wright.*

541. Clair, H. W. **Scottish chamomiles.** Chem. and Druggist 91: 1512. 1919.

542. Clements, E. **Variation and mutation in Epilobium.** Carnegie Inst. Washington Year Book 17: 293. 1918.—No results yet presented, but statement that "the production of flower mutation by manipulating the flow of food to different parts through pruning, mutilation, change of position, correlation, etc., has proved unusually successful."—*Merle C. Coulter.*

543. Clouston, D. **The selection of rice on the Raipur Experimental Farm.** Agric. and Co-op. Gaz. [India] 15^7: 5–9. 1919.—The author describes the method of improvement of available varieties of rice (*Oryza sativa*) by mass selection, and the testing of promising varieties in plots. Rice cultivated in the Central Provinces, India, falls into three classes: early, maturing in 3 to 4 months and suitable for upland soils; medium, maturing in 4 to 5 months; and late, maturing in 5 to 6 months, suitable for irrigated land only. Late varieties give the largest yield.—*Winfield Dudgeon.*

544. Coates, Leonard. **Improvement of fruit trees.** California Citrograph 3: 52. *1 fig.* Jan., 1918.—Tree-fruit breeding; popular; describes a bud mutant in the French prune.—*Howard B. Frost.*

545. Cockerell, T. D. A. **Some western columbines.** Torreya 19: 137–141. July, 1919.—A discussion of observations upon *Aquilegia desertorum*, *A. elegantula*, *A. chrysantha*, and their crosses which indicate that *Aquilegia* is an unusually favorable genus for the investigation of genetic problems. Some of its advantages are the following: (1) The ready hybridization and the fertility of the F_1. (2) Tendency to mutate, apart from crossing. (3) The existence of spurred and spurless forms, and of forms with and without colored plastids and anthocyanin colors. (4) The heterozygotes can be easily preserved and propagated by dividing the crowns. (5) Incidentally, beautiful and interesting garden plants are produced. —*F. O. Grover.*

546. Cole, Leon J. **A defect of hair and teeth in cattle—probably hereditary.** Jour. Heredity 10: 303–306. *Fig. 6–10.* Oct., 1919.—A note on the occurrence of defective teeth and hair in a herd of pure-bred Holstein-Friesian cattle. A pure-bred sire having defective

teeth and bred to pure-bred cows, produced in 2 successive years 5 calves with deficient coats, 3 of which are known to have defective dentation corresponding to the sire. Since the bull was not born on the place and all of the calves including 15 to 20 normal ones were all reared under similar conditions it is probable that the cause is genetic rather than physiological.—*Maxwell J. Dorsey.*

517. Conklin, Edwin Grant. Heredity and environment in the development of men. *3rd ed., 15 × 21 cm., v + 361 p., 101 fig.* Princeton University Press: Princeton, N. J. 1919. —Present edition like previous ones is divided into six chapters. (1) Facts and factors of development. Includes detailed treatment of development of body and mind and discussion of theories of development. Emphasis is placed on essential unity of organisms; intrinsic (hereditary) and extrinsic (environmental) factors of development are discussed. (2) Phenomena of inheritance. Observations on inheritance are described and statistical and experimental methods of study are compared. List of human characters which Mendelize is given. Doctrine of universality of Mendelian principles is supported. (3) Cellular basis of heredity. Includes account of germ-cell formation and behavior in fertilization, sex-determination, mechanism of heredity and of development. Specific rôles of chromatin and cytoplasm in heredity and development are contrasted. (4) Influence of environment. Includes discussion of relative importance of heredity and environment and account of experimental modification of development. (5) Control of heredity; eugenics. Methods of breeding employed in establishment of domesticated races of animals and plants are described and control of human heredity is discussed. (6) Genetics and ethics. Voluntaristic conception of nature and of human responsibility, mechanistic conception of nature and of personality, determinism and responsibility, the individual and the race, are topics discussed. Potentialities of development are contrasted with actualities; heredity is regarded as determining a limit, closeness of approach to which depends upon factors of development. List of larger references, glossary, and index complete the book. Subject material and illustrations are carefully selected; animal side is emphasized, but plant side is not neglected; each phase of the subject is developed logically; historical allusions are skillfully interwoven in the text; and biological principles are related in a scholarly manner to the great body of human thought.—Present edition differs from second only in minor changes in text and figures, except in third chapter which has been rearranged and revised in order to give proper weight to results of *Drosophila* investigations. Among other changes are introduction of more numerous chapter headings, exchange of places of second and third chapters, and reduction in number of pages (from 550 in second edition), which has been accomplished by use of smaller type. Subject material has been very slightly augmented, number of figures has been increased from 96 to 101.—*R. E. Clausen.*

518. Conklin, E. G. The mechanism of evolution in the light of heredity and development. Sci. Monthly 9: 481–505. 1919. *Ibid.* 10: 52–62. *Fig. 1–10.* 1920.—The illustrations are all zoological.—The paper discusses the experimental and analytical studies of inheritance and development in their relation to evolution.—*L. Pace.*

549. Cook, O. F. Olneya beans. Jour. Heredity 10: 321–331. *Fig. 13–17.* 1919.—A discussion of the economic and genetic possibilities of *Olynea tesota*, a southwestern desert leguminous tree. The wood is heavy and hard, the beans edible and the tree hardy. There are many possibilities in selection both for bean production and as a wood plant for the desert.—*Maxwell J. Dorsey.*

550. Correns, C. Vererbungsversuche mit buntblättrigen Sippen. II. Vier neue Typen bunter Periklinalchimären. [Genetical studies with variegated races. II. Four new types of variegated periclinal chimeras.] Sitzungsber. K. Akad. Wiss. 44: 820–857. 1919.—The four new types of periclinal chimeras described are, *leucodermis* (found in *Arabis*, *Aubretia*); *pseudoleucodermis* (found in *Arabis*, *Glechoma*); *chlorotidermis* (found in *Arabis*); and *albopelliculatus* (found in *Mesembryanthemum*). They are compared with Baur's '*albotunicatus*' type found in *Pelargonium*.—All four types are anatomically alike. *Leucodermis*, *pseudoleucodermis* and *albo-*

pelliculatus have a white cell layer below the epidermis and a green core, thus showing green and white in the leaves. *Chlorotidermis* has a bright yellow-green subepidermal layer and a green core.—*Leucodermis* and *albopelliculatus* are classed together since both transmit the white "diseased" condition of the subepidermal layer to their seedling progeny. This transmission is produced only through the egg cells, not through the pollen. The genotype of the nucleus is the same in both the white subepidermal layer and the green core.—*Pseudoleucodermis* and *chlorotidermis* are similar. In this case, the seedling progeny inherits the white or pale green character of the subepidermis through a definite Mendelian factor that is recessive to normal green. There is no transmission or cytoplasmic inheritance here. The nucleus of the white or pale green subepidermis contains this recessive factor, while the green cells of the same plant contain the dominant allelomorph in a homozygous or heterozygous condition.—*E. W. Lindstrom.*

551. Correns, C. **Vererbungsversuche mit buntblättrigen Sippen. I. Capsella bursa-pastoris albovariabilis und chlorina. [Genetical studies with variegated races. I. Capsella bursa-pastoris albovariabilis and chlorina.]** Sitzungsber. K. Akad. Wiss. Wien 34: 585–610. 1919.—The *chlorina* race of *Capsella* is a pale-green type which is inherited as a simple Mendelian recessive to normal green. A physiological examination of the chlorophyll content indicates that there are two kinds of *chlorina* plants, one *euchlorina* with 45 per cent and the other *subchlorina* with 65 per cent of the normal chlorophyll content.—The *albovariabilis* race is a white-variegated type that shows a great deal of variation in the proportion of green and white areas in the leaves and seed capsules. The author says that the *albovariabilis* character may be thought of as a disease, the inheritance of which is governed by a Mendelian pair of factors. *Albovariabilis* is recessive to normal green. In the F_2 generation both 3:1 and 15:1 ratios were obtained, indicating that there are two pairs of factors concerned.—Selection for increase of green or of white variegated progeny from *albovariabilis* was effective. This, the author is inclined to attribute to the action of modifying genes. The selection process had two general effects, one a temporary and the other a permanent one.

The temporary result which last only as long as selection continued, was obtained when the selection was in the direction towards increased amount of variegation. The permanent result was achieved when the selection was made towards full green.—*E. W. Lindstrom.*

552. Costantin, J. **La mutation. État actuel de la question. [Mutation. Present status of the question.]** Ann. Sci. Nat. Bot. X. 1: iii–xxix. 1919.—Of various mutants reported by De Vries author dwells particularly on *Oe. gigas;* at first anomalous in that it originated only once in early culture. More recently Gates studied a *gigas* that originated at Palermo and Heribert-Nilsson obtained a *gigas* mutant at Lund. Gates linked up *gigas* traits with doubling of chromosome number which led to enlargement of individual cells. Author cites work of the Marchals who by cuttings from sporophytes of mosses secured $2x$ gametophytes different from $1x$ gametophytes; considered mutation experimentally produced; refers to relation of cell characters to chromosome number in the Marchals' moss mutations, Oenotheras, and in banana varieties. After emphasizing cases connected with alteration of chromosome numbers author refers briefly to Babcock's discussion (1918) on factor mutation in plants with same visible chromosome complex. Author considers possibility of the *Oenothera* mutation phenomena being results of a previous hybridization as suggested by Bateson and Saunders in 1902, opposed by MacDougal (1903), reaffirmed by Davis (1911), who synthesized a *Lamarckiana*-like form, and by Lotsy (1916), who considered *O. Lamarckiana* a heterozygote on basis of crossing results. Leclerc de Sablon explains *Oenothera* mutation phenomena on basis of heterozygous factors that are linked and thus show reduplication at gametogenesis. The *nanella* mutant is discussed and Zeylstra's discovery of bacterial parasite often associated with nanism. Two mutations in *Capsella* are considered by author large enough to be generic changes, i.e., *C. Heegeri*, whose capsule resembles that in genus *Camelina* and *C. Viguieri* with capsule like that of genus *Holargidium*. Theoretic edifice of De Vries (pangenes in active, inactive, and labile conditions) is given to explain mutation and remarkable hybridization results in *Oenotheras*. Origin of labile (unstable) pangenes from others gives

pre-mutation period which prepares way for period of repeated mutation; latter ceases when labile pangenes become stable. Author believes De Vries has neglected action of physico-chemical forces as causes of mutation; Blaringhem's work on traumatism in maize is cited as confirmatory here. Considering all things mutation theory is deemed not discredited.—*J. P. Kelly.*

553. C[oulter], J. M. **Aaron Aaronsohn.** Bot. Gaz. 68: 388–389. *1 portrait.* Nov., 1919.—Subject of this brief sketch lost his life May 15, 1919 in an airplane accident in France. He is well known for his discovery of wild wheat in Palestine, whose value as a foundation for the production of varieties suited to arid regions, he immediately recognized. He organized the Jewish Agricultural Experiment Station at Haifa, Palestine, where breeding of cereals and fruits was undertaken. "In Aaronsohn's death, at the age of 42, the science of plant-breeding, especially in its practical application in semi-arid regions has probably lost its most promising investigator."—*Geo. H. Shull.*

554. Coulter, Merle C. **Quantitative nature of sex.** [Rev. of: Schaffner, John H. **The nature of the dioecious condition in Morus alba and Salix amygdaloides.** Ohio Jour. Sci. **19**: 409–416. 1919. (See Bot. Absts. 3, Entry 1575.)] Bot. Gaz. **68**: 485. Dec., 1919.

555. Crow, J. W. **Vegetable seed growing and breeding.** Proc. Amer. Soc. Hortic. Sci. **15**: 88–93. 1918.—From work being carried on at the Agricultural college at Guelph, Ontario, it is found that good seed of most vegetable crops can be grown in Canada. As most varieties of vegetables are far from pure author recommends that growers select their own seed with aim of securing greater uniformity. He gives suggestions on methods of selection, and details of drying and curing seed.—*John Bushnell.*

556. Cutler, G. H. **A dwarf wheat.** Jour. Amer. Soc. Agron. **11**: 76–78. 1919.—In commercial plat of Marquis wheat a dwarf plant occurred. Some typical Marquis heads were selected and sown in head rows. One row produced talls and dwarfs. Origin of dwarf was not clear. Author concludes dwarfness is simple dominant to tallness. [See also Bot. Absts. 3, Entry 171.]—*H. H. Love.*

557. Dahlgren, K. V. O. **Über einige Kreuzungsversuche mit Chelidonium majus L., Polemonium coeruleum L., und Lactuca muralis L. [On several crossing experiments with Chelidonium majus L., Polemonium coeruleum L., and Lactuca muralis L.]** Svensk. Bot. Tidskr. 12: 103–110. 1918.—*Chelidonium majus* with normal leaf and single flower crossed with *C. laciniatum* with laciniate leaf and double flower, results in dominance of normal leaf and single flower and a 9:3:3:1 segregation in F_2. In *Polemonium coeruleum* L. blue flower color is dominant to white. In *Lactuca muralis* L. the normal green leaf was found to be dominant to red leaf with a 3:1 segregation in F_2.—*Karl Sax.*

558. Davenport, C. B. **Exhibit showing the results of selection for a new buff race.** Proc. Soc. Exp. Biol. and Med. **16**: 124–125. 1919.—An attempt was made to create a uniform buff race from the jungle fowl by crossing and selection, but at the end of 10 years no progress was evident. The author concludes that the original buff race of domestic poultry probably originated as a xanthic sport.—*H. D. Goodale.*

559. Davenport, Charles B. [Rev. of: Popenoe, Paul, and Roswell H. Johnson. **Applied eugenics.** *14 × 20 cm., v + 459 p., 46 fig.* Macmillan Co.: New York, Oct., 1918. See Bot. Absts. 3, Entry 279.] Mental Hygiene **4**: 248–249. Jan., 1920.

560. de Beauveric, J. **Los methodos des eleccion aplicados a los cereales. [The methods of selection applied to the cereals.]** Jalisco Rural [Mexico] **1**: 213–215, 233–235, 256–258. 1919. —Popular.

561. Detjen, L. R. **Some F_1 hybrids of Vitis rotundifolia with related species and genera.** North Carolina Agric. Exp. Sta. Tech. Bull. 18: 1–50. *33 fig.* Aug., 1919.—Hybrid vines derived from *Vitis rotundifolia* and species of Euvitis are usually more or less intermediate in character.—The muscadine group when hybridized with species of Euvitis is not as prepotent in regard to its external visible characteristics as has generally been supposed.—Hybrids derived from *Vitis rotundifolia* and species of Euvitis are almost sterile, due mainly to hybridization. Perfect hermaphroditic forms are sterile from this cause alone, while imperfect hermaphroditic and staminate vines are sterile because of the double phenomenon of sex or intersexualism and hybridization.—So-called "false hybrids" referred to in horticultural literature as hybrids between Muscadine vines and species of Euvitis are not hybrids but straight seedlings of the supposedly dominant parent species *Vitis rotundifolia* and *Vitis Munsoniana.*—*R. A. Jehle.*

562. Detjen, L. R. **The limits in hybridization of Vitis rotundifolia with related species and genera.** North Carolina Agric. Exp. Sta. Tech. Bull. 17: 1–25. July, 1919.—*Vitis rotundifolia* will hybridize with *V. Munsoniana* and the following species of Euvitis; *V. vinifera, V. Bourquiniana, V. labrusca, V. cordifolia,* and *V. aestivalis,* also with the varieties Winchell, Concord, and others.—*Vitis rotundifolia* would not hybridize with *Parthenocissus tricuspidata,* or *Ampelopsis heterophylla* var. *elegans.*—*Vitis rotundifolia* will hybridize with its own F_1 hybrids with other species of *Vitis.*—*Vitis rotundifolia* when used as a male parent will hybridize quite readily with some species of Euvitis but when used as a female parent it will hybridize only rarely.—*R. A. Jehle.*

563. Detlefsen, J. A., and E. Roberts. **Variation in the percentage of crossovers and selection in Drosophila melanogaster.** Anat. Rec. 17: 336. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Series A. Long-winged red-eyed F_1 females heterozygous in miniature wing and white eye were mated in pairs to their miniature-winged white-eyed F_1 brothers. The F_2 offspring of the F_1 female showing the lowest percentage of crossing over were selected and mated. Continued inbreeding and selection gave a stock showing about 0 per cent crossovers at the end of ten generations, as compared with 33 per cent at the beginning of the experiment. This stock bred *en masse* for 6 more generations continued to give about 0 per cent crossovers. For example, in the F_{15} we obtained 2 crossovers in a total of 977.—Series B. The same experiment was begun a year later with stock entirely unrelated to that of series A. Inbreeding and selection were continued for 28 generations and gave a stock showing 5 per cent crossovers, as compared with the normal 33 per cent at the beginning of the experiment. The stock has bred true to about 5 per cent crossovers for 10 generations.—Decrease in percentage of crossover has been accompanied by the increased appearance of non-disjunctional females. Tentatively, we have concluded that selection has increased the amount of heterosynapsis which would thus prevent the appearance of crossover classes.—*J. A. Detlefsen and E. Roberts.*

564. Detlefsen, J. A., and E. Roberts. **Linkage of genetic factors in mice.** Anat. Rec. 17: 338. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Data were obtained to throw light on 17 of the possible 21 linkage relationships which may exist between any 2 of the following 7 allelomorphic pairs: agouti vs. its absence, black vs. brown, dark eye vs. pink eye, self vs. recessive spotting, dominant spotting vs. its absence, normal gait vs. waltzing, and color vs. albinism. In all cases except those involving either black, or dark-eye, or self with normal gait, the hybrids were mated back to the ultimate recessive to obtain data in the most advantageous form for disclosing linkage. In the exceptional cases the F_1 generation was mated inter se. As a test against simple Mendelian recombination, sixteen of the seventeen cases showed no wide deviations, and thus rule out any linkage except of such a loose nature that enormous numbers would be required to show it, which, for practical purposes is tantamount to no linkage. In the case of dark eye and color, a definite linkage was found, both when the F_1 was mated *inter se* and when back-crosses were made to the ultimate recessive. The latter case is the

more reliable and shows 16.1 per cent crossovers in a total of 1449. The results from F_1 mated *inter se* giving a total of 768 agree tolerably well with this.—*J. A. Detlefsen and E. Roberts.*

565. Detlefsen, J. A., and W. W. Yapp. On the inheritance of congenital cataract in dairy cattle. Anat. Rec. 17: 339. Jan. 20, 1920. [Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—A pure-bred Holstein-Friesian bull, R. T. H., was mated to unrelated cows, and produced 93 normal F_1 offspring. His normal F_1 son, I. V. H., was mated to 32 normal F_1 sisters and half-sisters, giving 63 offspring, of which 8 (6 bulls + 2 heifers) showed well-defined congenital cataract. The sire, E. T. H., was also mated to 6 F_1 daughters, producing 7 offspring, of which 3 (1 bull + 2 heifers) were blind. If congenital cataract is a simple recessive character, then the sire and son should produce a population of which 12.5 per cent are blind. The total results, 70 offspring, of which 59 were normal and 11 were blind, agree tolerably well with the calculated expectation, 61.25 normal plus 8.75 blind.—*J. A. Detlefsen and W. W. Yapp.*

566. Dorsey, M. J. Bud variation as a practical asset in horticulture. Minnesota Hortic. 46: 304–311. *2 fig.* 1918.—Relation between bud variations and improvement of horticultural varieties. Cites monographs of New York (Geneva) Station which show that 5 of 2664 varieties (apple, cherry, grape and plum) arose by bud variations. Gives instance of supposed bud sport in Duchess apple, which reproduced itself when top-worked. Shape of apple was unchanged but fruit was of darker red color. Selection of scions from best plants is sound practice.—*H. K. Hayes.*

567. Dorsey, M. J. A study of sterility in the plum. Genetics 4: 417–488. *5 pl.* Sept., 1919.—Sterility is of the type of self- and cross-incompatibility and of embryo abortion. Normal pollen development typical; many aborted grains found in all varieties investigated and in some supposedly pure species but pollen abortion not a cause of sterility except in rare instances where suppression is complete. Percentage of aborted pollen higher in hybrids than in species supposed to be pure. Pistils drop in three separate and distinct waves: immediately after bloom, pistils aborted; 2 to 4 weeks after bloom, pistils not fertilized; 2 weeks later "June drop," pistils fertilized but embryo development stopped. Pollen abortion considered to be due to haploid factor combinations not suitable for development.—*D. F. Jones.*

568. Duerden, J. E. The germ plasm of the ostrich. Amer. Nat. 53: 312–337. *3 fig.* July–Aug., 1919.—Germ plasm (or determiners) of the ostrich is considered from two opposing view points, one holding it to be stable, the other labile. In support of the first view, it is stated that each bird produces over 200 feathers annually, which are minutely examined. In the 50 years of methodical ostrich farming " . . . . a feather variation, germinal in its origin, such as could be regarded as of the nature of a sport or mutation" has not appeared. On the other hand, there is considerable variation in the number of remiges, wing coverts, toe nails and the scutes of the feet, thus affording evidence of instability of the germ plasm. —*H. D. Goodale.*

569. Dunn, L. C. Anomalous ratios in a family of yellow mice suggesting linkage between the genes for yellow and for black. Amer. Nat. 53: 558–560. Nov.–Dec., 1918.—A family of yellow mice heterozygous for factors *Y* for yellow, and *B* for black, descended from a cross of black and tan, *YyBB*, and brown *yybb*, has given an excess of brown and a deficiency of black young among the non-yellow animals produced. It seems that linkage between factors for *Y* and *B* is involved or that discrepancies are due merely to chance. Further data to decide this point are hoped for.—*C. C. Little.*

570. Dürken, Bernhard. Einführung in die Experimentalzoologie. [Introduction to experimental zoology.] *x + 446 p., 224 fig.* Julius Springer: Berlin. 1919.

571. East, Edwin M., and Donald F. Jones. Inbreeding and outbreeding. *14 × 21 cm., 285 p., 46 fig.* J. B. Lippincott: Philadelphia. 1919.—Early marriage customs and methods of animal breeding are founded upon conclusion that inbreeding frequently gives undesirable results. Inbreeding, however, has been often practiced and has given us our best races of horses, swine, cattle and poultry, while in Ancient Egypt and Greece at height of their power rather close inbreeding was practiced. One purpose of authors is to present critical data as basis of determining application of certain fundamental principles to sociology, agriculture and evolutionary theory.—In concise, clear manner are presented well known facts of reproduction in plants and animals together with cytological basis upon which mechanism of heredity depends. These facts furnish principles upon which explanation of heterosis has been developed.—It is shown that, in general, sexual reproduction occurs in higher forms of life and asexual in simpler, although many of our most vigorous plants are usually self-fertilized. Degeneracy which often occurs in asexually propagated varieties of potato and sugar cane is most logically explained by diseases which are with difficulty eradicated because of the method of propagation. Conclusion reached that Knight-Darwin Law should read "Nature discovered a great advantage in occasional cross-fertilization." Adaptations for cross-pollination in plants are briefly discussed.—Well known facts of Mendelism, together with present factor hypotheses, relative stability of factors and analogies between this explanation and the stability of the chemical atom are clearly outlined. Although chemical element radium is breaking down rapidly this does not seriously detract from value of atomic theory. Likewise occasionally demonstrated changes which occur in factors do not seriously mar value of factor hypotheses, for they occur so infrequently that theory of permanent entity is justified.—Mathematical considerations of inbreeding are presented. Formulae for comparative measure of actual number of ancestors compared with possible number are given for different systems of mating. It is stated that these formulae do not tell anything concerning actual germinal constituents of any individual resulting from given system of inbreeding. Formulae for increase of homozygotes in any generation following cross when self-fertilization is practiced are presented. It is demonstrated that decrease in heterozygosity is automatic and varies with closeness of inbreeding. The way in which factor linkage modifies results is illustrated for two factor pairs. That artificial self-fertilization in cross-fertilized species and normal self-fertilization in self-fertilized species following artificial cross, give same results from Mendelian standpoint is clearly proven.—In light of these mathematical considerations results of controlled inbreeding experiments are analyzed. Results from animal and plant field are presented with special emphasis upon long-continued experiments of self-fertilization with maize as obtained at the Connecticut Experiment Station. All experiments show that "inbreeding has but one demonstrable effect on organism subjected to its action—the isolation of homozygous types." Inbreeding is not injurious "merely by reason of consanguinity." Facts of hybrid vigor or heterosis are next reviewed and cause of heterosis discussed. Review of theories of hybrid vigor given and present conception of combined action of dominant linked factors shown to be closely related to former physiological stimulus idea. Conclusion reached that "Homozygosity when obtained with the combination of all the most favorable characters is the most effective condition for the purpose of growth and reproduction."—Sterility is discussed and conclusion reached that sterility often accompanying inbreeding is not same thing as sterility resulting from hybridization. First case is phenomenon of Mendelian heredity because certain segregations have occurred which accomplish certain end results. In other case individuals are sterile because they cannot go through this same process because of lack of compatibility of uniting cells.—It is pointed out that the vital feature of cross-fertilization from standpoint of evolution "is to be explained solely on the ground of offering selective agencies the greatest amount of raw material."—As applied to plant and animal improvement, effects of inbreeding and outbreeding are discussed. Inbreeding is shown to be important agency in bringing about uniformity and concentrating desirable qualities in particular race while crossing induces variability as basis for origin of new and valuable types of plants and animals. As the F_1 is often more vigorous than its parents, it is logical to maintain pure races which are used as parents, the F_1 cross being grown as commercial product.—Application of the truths so ably developed, to science of eugenics is interestingly discussed. Racial mix-

tures induce variability while periods of inbreeding give opportunities of isolating desirable recombinations. Wide crosses should apparently be discouraged. Chances for racial stamina shown to be much greater when ingredients in the Melting Pot are sound at beginning.—*H. K. Hayes.*

572. Eisel, Georg. **Zur Kenntnis zweier Formen der Heredodegeneratio nervosa mit pseudo-bulbärparalytischen Symptomen. [To the knowledge of two forms of heredodegeneratio nervosa with pseudo-bulbal paralytic symptoms.]** Inaug.-Dissertation. Rostock, 1918.

573. Feenstra-Sluiter, C. **Waarnemingen en Beschouwingen over Bloei, Bevruchting en Zaadvorming bij Cinchona Ledgeriana Moens. [Observations and considerations concerning flower, fructification, and seed formation with Cinchona Ledgeriana Moens.]** Mededell. Kina Proefsta. Dept. Landb. Nijverheid en Handel. [Tjinjiroean Java] 6: 1–35. *4 pl., fig. 1–20.* 1919.—See Bot. Absts. 4, Entry 986.

574. Fisher, R. A. **The genesis of twins.** Genetics 4: 489–499. *2 fig.* Sept., 1919.—Thorndike's statistical study of twins shows absence of two distinct categories. Author believes that this demands a new theory of twinning in which heredity is from one gamete only. Suggests that uniovular twinning may be due to double fertilization and accompanying fission of egg. Mathematical treatment of the subject.—*Chas. B. Davenport.*

575. Florin, Carl, and Rudolf Florin. **"P. J. Bergius," en ny äpplesort. ["P. J. Bergius," a new kind of apple.]** Acta Horti Bergiani Stockholm 6^5: 1–6. *1 pl., 1 fig.* 1919.—A scion was taken from an old Säfstaholm apple-tree. The branch that was developed from this scion produced fruits which did not show the rosy-colored stripes on green-white ground, which are so characteristic for the Säfstaholm apple. The apples were on the contrary colored intensively and uniformly dark red on all sides. A colored picture of this new fruit is attached to the paper.—Scions taken from this new sort of apple-tree have all given apples of the same kind.—The pollen of the new variety has considerably less power of germination than that of the common Säfstaholm apple. Parthenocarpy seems not to take place; the "P. J. Bergius" apple ought consequently not to be planted in great groups, but between other sorts of apples with pollen more capable of germination.—*K. V. Ossian Dahlgren.*

576. Fries, Thore C. E. **Antennaria alpina (L.) Gaertn. och dess skandinaviska elementararter. [Antennaria alpina and its scandinavian elementary species.]** Svensk Bot. Tidskr. 13: 179–193. *1 fig.* 1919.—A list of all the rare finds in Scandinavia of ♂ individuals of the apogamous *A. alpina* is given. Author has moreover found two of the elementary species described from Greenland, viz., *A. intermedia* (Rosenv.) Pors. and *A. glabrata* (J. Vahl) Pors. in Swedish Lapland. Author gives a discussion of the arrival to and spreading in Scandinavia of the ♂ form of *A. alpina.* Seeds are of course never formed and an effective spreading by means of sterile rosettes or leaves is hardly to be thought of. The possibility that the ♂ individuals are not constant males in all circumstances, but that certain conditions may induce them to form seeds, is pointed out. The possibility of an "atavistic" production of males from the apogamic ♀ individuals is looked upon as rather improbable in the light of modern study of inheritance.—*K. V. Ossian Dahlgren.*

577. Fruwirth, C. **Zum Verhalten der Bastardierung spontaner Variationen mit der Ausgangsform. [The behavior of the hybridization of a spontaneous variation with the original form.]** Zeitschr. Pflanzenzücht. 7: 66–73. *2 fig.* June, 1919.—See Bot. Absts. 4, Entry 2224.

578. Gassul, R. **Eine durch Generationen prävalierende symmetrische Fingerkontraktur. [A symmetrical contraction of the fingers prevailing through generations.]** Deutsch. med. Wochenschr. 44: 1197–1198. *2 fig.* 1918.—See also Bot. Absts. 4, Entries 2229, 2230.

579. Gervais, Prosper. [Rev. of: Rouart, Eugene, and Louis Rives. **Les hybrides producteurs directs pour la reconstitution du vignoble. (The hybrid direct-producers for the reconstitution of viticulture.)]** Compt. Rend. Acad. Agric. France 5: 293–297. 1919.

580. Gleason, H. A. **Variability in flower-number in Vernonia missurica Raf.** Amer. Nat. 53: 526–534. Nov.–Dec., 1919.—Statistical study of a few plants indicates number of flowers to be greatest in terminal heads of each cyne. Range of variability of flower number is smaller for individual plants than for entire population.—*Helene Boas Yampolsky.*

581. Gleason, H. A. **The history of the London plane.** Jour. New York Bot. Gard. 20: 216–220. Nov., 1919.—Largely extracts from "The history of the London plane" by A. Henry and M. G. Flood in Proceed. Royal Irish Acad. Describes in some detail history of the London plane, *Platanus acerifolia*, usually regarded in the United States as *Platanus orientalis*. Former is common street tree, has remarkable vigor, and is very resistant to smoke, drought and other unfavorable city conditions. *P. orientalis* is rarely planted as street tree. London plane probably a first-generation hybrid between *P. orientalis* and *P. occidentalis*, which explains its remarkable vigor and the great variability of its seedlings, part of which are similar to supposed parents, and part combine characters of both parents in various ways. Possibly originated at Oxford Botanic Garden about 1670 from chance hybridization. Experimental proof for this assumption could be obtained in the United States where adult trees of both natural species are to be found.—*O. E. White.*

582. Godfrey, M. J. **The problem of the British orchids.** Jour. Botany 57: 137–142. 1919.—See Bot. Absts. 3, Entry 148.

583. Goetz, E. **Tabakanbauversuche. [Tobacco culture investigations.]** Badisches Wochenbl. 1919: 67–69. 1919.

584. Gouveia, J. T. **Climatic conditions as indicated by land shells on the island of Oahu.** Nautilus 33: 89–92. Jan., 1920.—Discusses differences in distribution of dextral and sinistral shells of *Achatinella cestus.*—*J. Arthur Harris.*

585. Gowen, J. W. **Variations and mode of secretion of milk solids.** Jour. Agric. Res. 16: 79–102. 1919.—A study based on the advanced registry records of the Holstein-Friesian Association. The mean, standard deviation, and coefficient of variation are given for quantity of milk produced in a year, age, quantity and percentage of butter fat and solids-not-fat. The average constitution of Holstein-Friesian milk as thus found is compared with the available data from other breeds of cattle and from other kinds of mammals. A slight, but significant, negative correlation (-0.098 ± 0.016) is found between quantity of milk and percentage of butter fat. The correlation between quantity of milk and percentage of other solids is also negative (-0.066 ± 0.037) but not significant, being smaller as well as based on fewer cases. Age is not found to be correlated to a significant extent with percentage of butter fat (-0.055 ± 0.018) but is correlated (negatively) with the percentage of other solids (-0.019 ± 0.035). The quantity of butter fat and of solids-not-fat are found to vary together, the partial correlation between them for a constant amount of milk, being $+0.564\pm0.025$. Data are presented on the difference in the constitution of milk in the morning and evening. Evening milk is found to be distinctly the richer in fat content but not appreciably different in solids-not-fat. The bearing of the data on the different theories of milk production is discussed. It is held that they favor the theory that milk is produced by secretion and not by cell disintegration.—*Sewall Wright.*

586. Gowen, J. W. **Report of progress on animal husbandry investigations in 1917.** Maine Agric. Exp. Sta. Bull. 274: 205–228. *2 pl., 1 fig.* 1918.—(1) Analysis of milk records: Relation of age to milk and fat production in Guernseys was studied, using correction factors found; influence of sires was studied on the basis of production of daughters compared to production of dams of these daughters.—(2) Variations and mode of secretion of milk solids: Short account of investigations, results of which have been published in Journal of Agricultural Research. 16: 79–105. 1919.—(3) Cattle judging as a means of selecting cows for the herd: Study was made of correlation between milk production and scores of 672 cows. Conclusion is reached that high-producing cows can be selected by external conformation only when two

to three years old.—(4) Breeding experiments: Full report of these experiments published in Bull. 272, Maine Agr. Exp. Sta.—(5) Inheritance of twinning and problems connected therewith: Observations on a free martin led to following conclusions: Free martin can come in heat; heat can appear in cattle having gonads very different in appearance from those of either normal sex; and growth or release of egg is not cause of heat.—(6) Coöperative cattle breeding records: Out of 2573 births, 21 were twins. Combining data concerning sex with data of Lillie, the ratio is 22 pairs where both are males to 38 pairs of one male and one female to 15 with both females, thus approaching closely a 1:2:1 ratio.—*E. Roberts.*

587. Grabner, E. **Ausleseverfahren zur Massenauslese der Maiskolben. [Selection experiences in the mass-selection of maize ears.]** Zeitschr. Pflanzenzücht. 7: 61–63. *1 fig.* June, 1919.—A method of sorting maize ears for seed into grades according to total weight of ear and per cent weight of grain in total weight of ear. Ears having above 89 per cent grain are divided into 6 classes according to total weight of ear, ranging from 200 to 500 grams. Specimens weighing above 450 grams and having a per cent of grain higher than 89 are put in first grade. Table shows per cent of grain for ears of any given total weight, from 200 to 500 grams, and weight of cob. Several years' selection in this way raised grain percentage from 65 to 68 in common maize to 82 to 83 which is figured to give an increase of 15 to 19 per cent in production of grain.—*D. F. Jones.*

588. Haecker, V. **Die entwicklungsgeschichtliche Vererbungsregel in der Völkerkunde. [The ontogenetic law of heredity in anthropology.]** Zeitschr. indukt. Abstamm. Vererb. 19: 73–78. 1918.—Two types of heredity manifest themselves following a cross between distinct races of men. With some traits segregation occurs, with others it does not. The traits that segregate are believed to be the ones which owe their character to a simple causal factor and which have a high degree of autonomy in development. Those that do not segregate but form permanent blends are the traits of a more complicated genesis and of a low degree of autonomy. Most features of the head and face are due to multiple ontogenetic reactions since the determining elements of soft tissues and bone are subject during development to the interplay of complex pressures and tensions exerted by other parts. In southeastern Europe the original Mongolian characteristics of Magyar and Turk have been diluted almost to the point of complete obliteration in so far as most traits,—those of complex origin,—are concerned, but at least one character, the "Mongolian spot," frequently appears in full strength. The development of the latter is comparatively a simple process, merely the localized deposition of pigment, hence its independent segregating behavior in heredity. Similarly one may explain the rather common occurrence of more or less dark-skinned people with blue eyes, skin color being a complex, blending trait, eye color a simple, segregating trait. Author does not commit himself as to whether blending traits, in whose development multiple ontogenetic factors are involved, do or do not owe their peculiarities to multiple genes in the usual sense. —*C. H. Danforth.*

589. Hagiwara, T. **Asagao no Ha no hutatu no Seisitu no aidano Sôkwankwandkei ni tuite. [On the correlation between two leaf-characters in the Japanese morning-glory.]** [In Japanese.] Nôgakukwaihô [Report of the Agronomical Soc.] 206: 897–901. Tôkyô, 1919.—A cross was made between a race of the Japanese morning-glory (*Convolvulus*) having green leaves with their margins rolled upwards and another having variegated ones with ordinary flat margin. F_1 possesses full green leaves with ordinary flat margin. In F_2 each of these allelomorphic pairs—full greenness and variegation, flat and rolled margin—when independently considered, is found to segregate respectively in typical 3:1 fashion; but when both of them are taken together into consideration, the ratio of the four kinds of zygotes produced, i.e., green-flat, green-rolled, variegated-flat, variegated-rolled, is quite different from the usual 9:3:3:1 and the author's conclusion drawn from their respective numbers—252:26:27:69—is that he has here to do with a case of linkage of the two allelomorphic pairs above cited in the gametic ratio 7:1:1:7.—*S. Ikeno.*

590. Haldane, J. B. S. **The probable errors of calculated linkage values, and the most accurate method of determining gametic from certain zygotic series.** Jour. Genetics 8: 291–297. Sept., 1919.—Assuming Bayes's theorem to be accurate, this paper derives probable error formulae for linkage and reduplication values calculated from the offspring of crosses of types AB. *ab*×*ab ab*, A*b*. *a*B×*ab ab*, AB. *ab*×AB. *ab* and A*b*. *a*B×A*b*. *a*B×A*b*×*a*B.

If the cross is A*a* B*b* × *aa bb* where n equals total number of zygotes obtained, P the observed value of p in a heterozygote A*a* B*b* producing gametes in the proportion $\frac{p}{2}$ AB: $\frac{1-p}{2}$ A*b*: $\frac{1-p}{2}$ *a*B: $\frac{p}{2}$ *ab*, the probable error of P is

$$0.6745\sqrt{\frac{P(1-P)}{n}}$$

of the observed X (coefficient in gametic series in case of coupling)

$$0.6745\ (X+1)\sqrt{\frac{X}{N}}$$

of the observed Y (coefficient in gametic series in case of repulsion)

$$0.6745\ (Y+1)\sqrt{\frac{Y}{N}}$$

Considering the F_2 zygotic series obtained by *inter se* mating of F_1 zygotes the expected proportions of which are

$$\frac{2+p^2}{4}\,AB : \frac{1-p^2}{4}\,Ab : \frac{1-p^2}{4}\,aB : \frac{p^2}{4}\,ab.$$

Put $t = p^2$, let t_a be an approximate value of t, while $T = t + \delta$ the most probable value from observation. T_1, T_2, T_3, T_4 be the four values of t calculated from the four observed classes observed.

$$t_1 = \frac{4\ (AB)}{n} - 2$$

$$t_2 = 1 - \frac{4\ Ab}{n}$$

$$t_3 = 1 - \frac{4\ (aB)}{n}$$

$$t_4 = \frac{4\ (ab)}{n}$$

Hence

$$T = \frac{3t_at_1 + (2+t_a)\ t_4}{2+4\ t_a}$$

while $P = \sqrt{T}$
for t_a take t_4 in repulsion or $\frac{1}{2}$ $(t_1 + t_4)$ in coupling.

Hence

$$\text{probable error of } T = 0.477\sqrt{\frac{4T\ (2+T)\ (1-T)}{n\ (1+2T)}},$$

$$\text{probable error of } P = 0.477\sqrt{\frac{(2+p^2)\ (1-p^2)}{(1+2P^2)n}},$$

$$\text{probable error of } X = 0.477\,(X+1)\sqrt{\frac{(3X^2+4X+2)\,(2X+1)}{(3X^2+2X+1)n}},$$

$$\text{approximately } 0.6745\,(X+1)\sqrt{\frac{X+7/6}{n}},$$

$$\text{probable error of } Y = 0.477\,(Y+1)\sqrt{\frac{(2Y^2+4Y+3)\,Y(Y+2)}{(Y^2+2Y+3)n}},$$

$$\text{approximately } 0.6745\,\frac{(Y+1)^2}{\sqrt{n}}.$$

These results are employed to show that F_2 is almost as accurate a means of measuring linkage as are the offspring from $F_1 \times$ double recessive; it is also slightly more sensitive as a means for the detection of linkage.—*John W. Gowen.*

591. Haldane, J. B. S. **The combination of linkage values, and the calculation of distances between the loci of linked factors.** Jour. Genetics 8: 299–309. *1 fig.* Sept., 1919.—Using the data contained in "Sex-linked inheritance in *Drosophila*" by Morgan and Bridges a curve is derived of the equation

$$x = 7y - \frac{3}{2}\,\text{Log.}_e\,(1-2y),$$

where x = distance, y = crossover value in 100 times the unit in ordinary use ("Morgan"), to describe the relation of observed crossover value for two factors in comparison with the actual distance were all crossovers.—From this equation it is shown that if A, B, and C are three factors lying in a chromosome in that order, and if m is the crossover value for A and B, n that for B and C, then the value for A and C lies between $m+n$ and $m+n-2mn$, being nearer the former when $m+n$ is small, to the latter when it is large.—To explain these results the hypothesis of a partly rigid chromosome is urged.—The relation between crossover value and distance permits the calculation of one of the crossover values for three factors from the other two with a probable error of less than 2 per cent.—The results above cited are used to show the incompatibility of Trow's form of the reduplication theory.—*John W. Gowen.*

592. Haraldson, C. **Report of the Fruit Breeding Farm, Zumbra Heights.** Minnesota Sta. Rept. **1918**: 94–98. 1918.—A report of progress in fruit breeding. Promising varieties of strawberry, plum and apple, have been numbered and recommended for trial. Selections are made only from the most hardy sorts. Additional crosses have been made in plum, raspberry, strawberry, apple, blackberry and dewberry.—*M. J. Dorsey.*

593. Harlan, H. V., and H. K. Hayes. **Breeding small grains in Minnesota. II. Barley investigations.** Univ. Minnesota Agric. Exp. Sta. Bull. **182**: 45–56. *Fig. 11–14.* Mar., 1919. —Minnesota ranks second as a producer of barley. Prior to 1915 there were two barley breeding nurseries at the Minnesota Experiment Station Farm, one operated by the Office of Cereal Investigations, Bureau of Plant Industry, the other operated by the Minnesota Experiment Station. In 1915 the work of the two sets of barley investigations was combined. The averages of oats for 68 selections and crosses are given in tabulated form, together with botanical types and agronomic characters. Three superior barleys survive a large number of field selections. These are Featherston, Lake City and Excelsior. The Manchuria selections showed some to be superior to others. One of the highest breeders from these selections was propagated for field growing. As wide variations in yielding-ability was found in the Manchuria variety as are ordinarily obtained when comparing different varieties. As the result of crosses, superior smooth-awned barleys have been produced. The smooth awn character was obtained from Lion, a smooth-awned black parent, and Manchuria, a standard variety. The smooth-awned types produced are illustrated by cut showing variations in types as the

result of the cross. Further work with smooth-awned sorts is under way. A cross between Manchuria and South African, a low-yielding, stiff-strawed variety, has given two selections of high yielding-ability and stiffer straw than the Manchurian parent. Results reported show necessity of severely testing new products in various state localities before distributing the same.—*Alvin Kezer.*

594. Harland, S. C. **The improvement of the yield of Sea Island cotton in the West Indies by the isolation of pure strains. Pt. II.** West Indian Bull. 17: 210–236. 1919.—For first part of this paper see Bot. Absts. 3, Entry 359. Second part deals with inheritance of length of fiber, weight of fiber per seed (lint index) and per boll, and weight of seed. Selection in a mixed stock for increased values for these characters gave positive results up to a certain point, when homozygosity was probably attained, since thereafter selection was apparently ineffective. A high positive correlation was found to exist between weight of fiber and weight of seed, and between weight of fiber per seed and per boll and yield of fiber per acre. Length of fiber and weight of fiber appear to be negatively correlated.—*T. H. Kearney.*

595. Harris, J. Arthur, and Francis G. Benedict. **Biometric standards for energy requirements in human nutrition.** Sci. Monthly 1919: 385–402. *8 fig.* May, 1919.—This paper is a more popular treatment of a technical paper. The data on the basal metabolism of 136 men, 103 women, 51 male infants and 43 female infants were used. The aim of the investigation was to determine the most accurate means of predicting from physical measurement what the normal basal metabolism of an individual should be. The determination of these basic equations involved the calculation of the correlations between body weight, stature, and age in relation to each other and to basal metabolism. From the multiple correlations of these variables the prediction equations for basic metabolism involving body weight, stature and age are determined. Those equations are shown to be accurate within an average plus or minus error of 5.30 per cent.—Illustration of the use of these equations is given for diabetic, vegetarian, and sex data on basal metabolism. The conclusions are that diabetes increases the basal metabolism of the affected individual 11.55 per cent; no difference in the basal metabolism of the vegetarian is noted; women have a lower basal metabolism than men. The difference in the basal metabolism of men and women is not evidenced by these data in infancy, but is in old age.—*John W. Gowen.*

596. Harrison, J. W. Heslop. **Studies in the hybrid Bistoninae. III. The stimulus of heterozygosis.** Jour. Genetics 8: 259–265. *2 fig.* Sept., 1919.—Hybrids between different genera show that, as the phylogenetic differences in the forms united increased, there was a concomitant and proportional increase in physiological robustness of the hybrid organism expressed in: (1) a size increased beyond the theoretical expectation; (2) an acceleration in the speed of feeding up of the larvae; (3) great disease-resisting powers; (4) an enormous reduction of the time of lying over. Wing expanse larger by from 2 to 8 per cent in a series of crosses. Cell size greater in one hybrid examined. Heterosis in this material is considered to be directly dependent on the cumulative differences between the factors building up the various genotypes and due to a physiological stimulus arising from either the reaction of male nucleus in female cytoplasm, or the heterogeneous nature of the zygote with respect to the genes, or to the presence in a given cell of a greater number of units than it was designed to receive. The reaction of other than Mendelian factors is thought to assist in the process. Most of the hybrids are sterile but one exception gave great variability in the second generation. Attention is called to the hybrid vigor, in itself, as an agency in increasing variability in segregating generations.—*D. F. Jones.*

597. Harrison, J. W. Heslop. **Studies in the hybrid Bistoninae. IV. Concerning the sex and related problems.** Jour. Genetics 9: 1–38. *1 pl., 10 fig.* Dec., 1919.—The wingless ♀ of *Nyssia zonaria*, a European geometrid with 56 chromosomes (haploid number) produces *only male* offspring (with the few exceptions noted below) when crossed with the ♂ of any of the following species:

(1) *Poecilopsis lapponaria* ⎫ Immediate phylogenetic source of *N. zonaria*. *P. lapponaria* was probably derived from *Lycia hirtaria*.
(2) *Poecilopsis rachelae* ⎭ Females normally wingless.
(3) *Poecilopsis pomonaria*, 51 chromosomes ⎫ More recently derived from *L. hirtaria*.
(4) *Poecilopsis isabellae*, 52 chromosomes ⎭ Females wingless.
(5) *Lycia hirtaria* (Stem-form of the group. ♀ winged. 14 chromosomes).

The exceptions are (1) that in the cross involving ♂ *P. rachelae* a few intersexes occur in the brood of male offspring.—(2) When any of these ♂♂ (except *L. hirtaria*) comes from inbred stock, a few female offspring are produced with the males, e.g., *P. pomonaria* ♂ gave 7 ♀♀, 71 ♂♂; 3 ♀♀, 62 ♂♂. (3) A half-size ♀ was obtained in addition to males from *N. zonaria* ♀ × (*P. pomonaria* ♂ × *isabellae* ♀).—The ♂ *N. zonaria*, on the contrary, in corresponding reciprocal crosses gives normal sex ratios, a slight excess of ♀♀ being usual. Another ♀ *Nyssia*, *N. graecaria* ♀ × *L. hirtaria* ♂ also produces only males, and the closely allied North American *P. rachelae* ♀ × *L. hirtaria* ♂ gives only males and intersexes.—Interpretation: The female being the heterozygous sex in Lepidoptera, both male and female-producing eggs are formed by ♀ *N. zonaria*, the phylogenetically youngest member of this group of species. These eggs are presumably (not demonstrably) distinguished by an X or a Y chromosome. The superior potency, or (quasi-electric) sex potential, of the sex factors or chromosomes, X′, X′, of the various sexually homozygous males of these "phylogenetically older" species forces the resulting X′Y zygotes (50 per cent) out of femaleness into maleness, except in those cases in which the potential of the sex factor of the male was lowered by previous inbreeding, whereby a few females remain untransformed, or, as in the cross involving *P. rachelae* ♂, a few intersexes occur with the males. In the interesting case of the ♀ of half-size, supplementary to the male offspring from *N. zonaria* ♀ × (*P. isabellae* ♀ × *P. pomonaria* ♂) ♂, the male parent was extraordinarily large and vigorous. The pygmy daughter is supposed to be the result of a dislocation of the XY chromosomes in the first cleavage so that, for example, instead of dividing and being distributed to each pole, one passes *undivided* to each daughter nucleus. If the resulting XO cell is non-viable, the other (YO) of female tendencies alone controls development of the supposed half embryo, regenerating a diminutive whole. Another method of chromosomal dislocation with similar outcome is mentioned.—The extraordinarily large proportion of males (190:14) from *L. hirtaria* ♀ of Scotch origin × *P. pomonaria* ♂, whereas this cross made with a ♀ *hirtaria* of English stock gives a normal ratio (e.g. 86 ♂♂; 75 ♀♀) is ascribed to a physiological "racial variation of the powers of the sex determiners," and inadvertently compared to cases like *zonaria* ♀ × *hirtaria* ♂ giving only males. Intersexes only are the product of the ♀ F_1 hybrid (*P. pomonaria* ♀ × *L. hirtaria* ♂) × *P. pomonaria* ♂. Genitalia of seven are described, and figures of the wings shown.—Interpretation: No reduction division is assumed to occur in gametogenesis of the hybrid mother. Her gametes thus carry X′Y (X′ from the *hirtaria* ♂) and those of the *pomonaria* ♂ bring X, forming zygote XX′Y, essentially ♀ but maladjusted by the presence of X′ and other supernumerary chromosomes. Chromosomal dislocations in mitosis at different stages of cleavage are assumed to explain the individual differences in sexual and somatic characters of the various fundamentally female gynandromorphs.—Finally the genitalia of an intersex (chiefly ♀) from *P. lapponaria* ♀ × *P. pomonaria* ♂, which occurred in a brood with normal sex ratio, are described.—*J. H. Gerould.*

598. Hayes, H. K., and R. J. Garber. **Breeding small grains in Minnesota. I. Technic and results with wheat and oats.** Univ. Minnesota Agric. Exp. Sta. Bull. 182: 1–44. *10 fig.* Mar., 1919.—Methods of technique, together with the history as practiced at the Minnesota Experiment Station, are outlined, for new introductions, straight selections and crosses. At Minnesota, the centgener plan of breeding, or straight selection, was apparently practiced from 1908 to 1914. New introductions were prolifically made from 1915 to 1917. Both spring and winter wheats are treated, giving varieties, methods and accomplishments. There is much tabular matter on the behavior of winter wheat at Grand Rapids and Waseca and averages for all stations. For spring wheat, results are given for University Farm, Crookston,

Morris, Waseca and general averages for all stations. The behavior of a number of Durum varieties is recorded for different Minnesota stations. Treatment is given for oats and their performance for different agronomic characters, such as yield, lodging, date of maturity, quality of grain. Crosses are reported to be made between parental sorts selected because of some particular desired characters. Methods of obtaining homozygous segregates by selection and bulk work are outlined. Mathematical formulae are given for the length of time or number of generations to make a cross automatically homozygous.—*Alvin Kezer.*

599. Hayes, H. K., and R. J. Garber. **Synthetic production of high-protein corn in relation to breeding.** Jour. Amer. Soc. Agron. 2: 309–318. 1919.—The authors believe that there are almost unlimited opportunities of improving corn by an application of the principles learned in inbreeding and crossbreeding. An experiment is outlined for the synthetic production of high protein corn by self-fertilization, crossing and subsequent selection. Three F_1 crosses between high-protein strains were studied in 1918 and were compared with Minnesota No. 13 which was the original source of the selfed strains. They gave an increase in average protein content of a little over 2 per cent as compared with Minnesota No. 13 and also yielded better.—*F. M. Schertz.*

600. Hayes, H. K., and P. J. Olson. **First generation crosses between standard Minnesota corn varieties.** Univ. Minnesota Agric. Exp. Sta. Bull. 183. *22 p., 2 fig.* Aug., 1919.—With a series of twelve crosses the authors have found the first generations exceeded the average of their parents, and in many cases the better parent, in yield of grain. In general the first generations were intermediate between the parents in maturity, height of plant, ear length and shelling per cent. The number of rows on the ears, however, were below the average of the parents in flint-dent crosses. The authors state that properly stored two-year-old seed may be expected to yield as well as similarly treated 1-year-old seed and better than 1-year-old seed which is not well ripened.—*J. H. Kempton.*

601. Hegner, Robert W. **The effects of environmental factors upon the heritable characteristics of Arcella dentata and A. polypora.** Jour. Exp. Zoöl. 29: 427–441. *7 fig.* Nov. 20, 1919.—In studying efficacy of selection as means of isolating heritably diverse lines within a clone of *Arcella dentata*, and in studying nucleo-cytoplasmic relation in this species and in *A. polypora*, experiments were performed to determine effects of environmental factors upon heritable characteristics of these organisms.—It was found that underfeeding retards the fission rate from an average of one division every 2.50-day period to one every 4 days; that shell diameter decreased, on the average, 2.68 units of 4.3μ each, and that there was a slight decrease in spine number.—The addition of one drop of sodium silicate to each 100 cc. of water decreased fission rate to same extent as underfeeding. Size is reduced, spines are almost entirely absent and usual brown shell color is replaced by greenish yellow.—Alcohol proved injurious to *A. dentata* though they are able to grow and reproduce in media containing from 0.25 to 1 per cent alcohol. It retarded fission rate and caused irregularities in shells.—There is some evidence that the lower the temperature the smaller become the spines of *A. dentata*.—Wild specimens of *A. polypora* having a bent oval shell with oval mouth, were found. These, under laboratory conditions, produced entirely normal later generations. The bent oval condition is probably due to unknown environmental factors.—Modifications produced by above environmental factors persist only so long as those factors are operative; therefore no heritable diversities due to the changed conditions were produced.—*A. R. Middleton.*

602. Hegner, Robert W. **The relations between nuclear number, chromatin mass, cytoplasmic mass and shell characteristics in four species of the genus Arcella.** Jour. Exp. Zoöl. 30: 1–95. *47 fig.* Jan. 5, 1920.—Protozoan genus *Arcella* is favorable for genetic research because germinal substratum and somatic characteristics are observable in living specimens; chromatin is in compact spherical mass at center of nucleus permitting quantitative observations; *Arcellas* are also able to withstand severe operations.—In *Arcella dentata* excised portion of shell is not regenerated. Removal of part of cytoplasm is followed in next gener-

ation from nucleated part by smaller daughter cell but original size for clone is regained in granddaughter cell. Portions may be removed repeatedly but as long as some of shell remains with nucleus and cytoplasm progeny will eventually regain characteristics typical for clone. Removal of part of chromidial net was without perceptible after-effect in these experiments. Bisection of binucleate specimens 15-spined and 35 units in diameter led eventually to uninucleate clones averaging 11 spines and 25 units in diameter; uninucleate condition usually persisted for from 6 to 33 generations. Return to binucleate condition occurred with empty cell formation, nuclear doubling seeming to have been initiated when cytoplasmic mass became greater than quantity normally associated with one nucleus. Restoration of binucleate status was *gradually* followed by cytoplasmic increase until after 3 or 4 generations nucleo-cytoplasmic relation of original binucleate line was attained, that is, a single great internal change is paralleled in soma by series of *small* changes in a definite direction (orthogenetic variation apparently). Observations of small changes, gradually accentuated in successive generations, in other protozoa can be interpreted as due to single discontinuous genotypic change only slowly influencing soma. In both uninucleates and binucleates there is a correlation between spine number and shell diameter of over 40 per cent. Two binucleate clones differed in shell diameter and larger was found to contain larger total mass of chromatin in each specimen than smaller.—In *Arcella polypora* examination of 54 wild specimens showed that nucleus number ranged from 3 to 10 with modal number 5; correlation between nuclear number and shell diameter among these wild individuals was low (0.156 ± 0.089). Diameters of different clones with same number of nuclei might differ; specimens of clone ap5, the diameters of whose members was large in comparison with number of nuclei, had large chromatin masses, while those of clone ap34, where the individual diameters were small compared to number of nuclei, possessed smaller chromatin masses. Within one large clone (family ap5) selection for large and small diameters was successful but the small-diametered sub-clone was found to be 4-nucleated while the larger-diametered sub-clone had 5- or 6-nucleated cells; in general within this clone there was a high correlation of diameter and number of nuclei (0.81 ± 0.023).—*Arcella discoides* resembled *A. dentata* in showing a smaller range of variation than *A. polypora*, which is associated with a constancy of nuclear number in first two species (2 nuclei in each). Biotypes of *A. discoides* with different average diameters were isolated from nature. Uninucleate specimens made by bisecting revealed relationships similar to those reported for *A. dentata* when compared with binucleates.—In *A. vulgaris* shapes as well size distinguished lines isolated from nature; variability resembled that in *A. dentata* and *A. discoides*.—Brief survey of development of conception of nucleo-cytoplasmic relation and of chromatin-cytoplasmic relation is presented and bearing of *Arcella* results is indicated.—*James P. Kelly.*

603. Heinrich, M. Der Einfluss moderner Reinigungsanlagen auf die Güte des Saatguts. [The influence of modern cleaning devices on the goodness of the seed.] Zeitschr. Pflanzenzücht. 7: 19–30. *4 fig.* June, 1919.—Shows use of modern cleaning devices with oats increases test weight, purity, percentage germination, and percentage strong healthy seedlings.—*Fred Griffee.*

604. Hennings, Hank. Mnemelehre oder Tierpsychologie? [The mneme theory or animal psychology?] Biol. Zentralbl. 39: 187–192. April, 1919.

605. Herlant, Maurice. Comment agit la solution hypertonique dans la parthénogenèse expérimentale (Méthode de Loeb). I. Origine et signification des asters accessoires. [How the hypertonic solution acts in experimental parthenogenesis (Method of Loeb). I. Origin and significance of the accessory asters.] Arch. Zool. Exp. et Gén. 57: 511–533. Nov., 1918.—Hypertonic solutions cause artificial parthenogenesis in sea urchin eggs by providing accessory asters. Monasters produced in activated egg before application of hypertonic solution are ineffective; accessory asters make efficacious bipolar mitosis possible. Capacity of solution for causing development of eggs depends on concentration and composition. NaCl, KCl, and OH ions favor accessory asters; $CaCl_2$ and $MgCl_2$ are neutral or inhibitory; H ions, KCN,

and anesthetics prevent cytasters. Agents alter permeability of egg membrane. Cytasters are produced artificially only during period of permeability of egg membrane. Author suggests salts penetrate egg at this time, become irregularly distributed in egg, and "salted" spots become centers of coagulation and liquefaction of colloids, thus forming asters.—*A. Franklin Shull.*

606. Herlant Maurice. **Comment agit la solution hypertonique dans la parthénogenèse expérimentale (Méthode de Loeb). II. Le mécanisme de la segmentation. [How the hypertonic solution acts in experimental parthenogenesis (Method of Loeb). II. The mechanism of segmentation.]** Arch. Zool. Exp. et Gén. 58: 291–314. *Pl. 13–14.* July, 1919.—Egg of *Paracentrotus lividus* stimulated to development by butyric acid alone forms monaster or several monasters one after another at successively shorter intervals and of successively shorter duration, but egg does not divide. Nucleus disappears while monasters are present but reappears, each time of larger volume, after each monaster, and toward end of series of monasters it may be fragmented. Fixed material shows that chromosome number, normally 18, doubles each time monaster is formed, but no cell division occurs and all chromosomes are recombined into one nucleus of larger size. Frequently at time of third or fourth monaster small spindle, perhaps in nucleus, is formed with very large number of chromosomes on its equator, in which condition egg remains until it disintegrates. In eggs treated first with butyric acid, then returned to sea water, and finally for 30 minutes to hypertonic solution, accessory asters are formed in addition to aster near nucleus. If only one accessory is formed it approaches the perinuclear aster, spindle is formed, and egg divides. Presence of two or more accessory asters may result in irregular divisions. Aster is physiological, not morphological phenomenon. Review of literature indicates most features of mitosis are largely independent of each other, and none is indispensable.—*A. Franklin Shull.*

607. Hertwig, Paula. **Keimesschädigung durch Physikalische und chemische Eingriffe. [Injury of the germ cells by physical and chemical means.]** Zeitschr. indukt. Abstamm. Vererb. 19: 79–99. Mar., 1918.—Author gives a short review of the most important recent contributions to the study of injurious effects of physical and chemical factors on development of germ cells.—She discusses briefly experiments of O. Bury (1912) on eggs of Echinids with low temperature; those of O. Hertwig (1913) on spermatozoa of *Rana fusca* and *Rana esculenta* with solutions of different chemical substances (methylenblue, eosin, fuchsin, atoxyl, sublimate, chloralhydrate, etc.); those of G. and P. Hertwig (1913) on germ cells of amphibia and fishes with different chemical substances (chloralhydrate, strychnine, nicotine, methylgreen, etc.); those of C. Herbst (1907 and 1913) on spermatozoa with radium solutions; those of O. Warburg (1910) with ammonia and thymol solutions; those of Mairet and Cambermal (1888) with alcohol; and those of Nice (1912) with alcohol, nicotine, tobacco smoke and caffeine. The general results of these experiments are stated in a few words.—The greater part of the article is devoted to a special consideration of the experiments by Stockard (1910, '12, '14), Stockard and Craig (1912), and Stockard and Papanicolaou (1916) on the action of alcohol on the germ cells of mammals. She considers these experiments to show conclusively the modification of the germ cells in mammals by chemical stimuli, but doubts whether the differences in results from treated males and females will continue to be significant after greater numbers are studied.—The article is as a whole a fair review of the papers considered.—*George N. Papanicolaou.*

608. Hessing, J. **Mitteilungen bezüglich der Variabilität einiger Grasarten. [Communications concerning the variability of some grass species.]** Zeitschr. Pflanzenzücht. 7: 53–57. June, 1919.—Marked variability in characters of *Lolium italicum* and *L. perenne.* Selfing three years isolated 3 groups, tall V-form, bushy U-form and low spreading plants each of which bred nearly true. Data are given on breadth and length of leaf and spike density. Author holds that selfing and individual-plant study is correct method of breeding these grasses.—*R. J. Garber.*

609. Higgins, J. Edgar. **Report of the horticultural division.** Hawaii Agric. Exp. Sta. Rept. 1918: 7, 8, 13–21. *Pl. 2, 3.* 1919.—See Bot. Absts. 4, Entry 971.

610. Hilson, G. R., and F. R. Parnell. **A simple method of selfing cotton.** Madras Agric. Yearbook 1917: 54, 55. 1918.—Method consists of sewing unopened flower bud near tip, passing thread also through involucre so that when corolla falls it remains attached to involucre, thus marking flowers which have been selfed.—*T. H. Kearney.*

611. Hindle, Edward. **Sex inheritance in Pediculus humanus var. corporis.** Jour. Genetics 8: 267–277. *1 chart.* Sept., 1919.—Breeding experiments with the clothes-lice were begun in 1912 but later were interrupted by the war and consequently are not very extensive. Pairings were made and the resulting families were composed, in some experiments, of nearly all male individuals, in some experiments of nearly all female individuals, while in others the two sexes occurred in about equal numbers. It was suggested that there were two kinds of females and two kinds of males according to their inherent capacity to produce male or female offspring. During these experiments the lice were fed upon the human arm.—*D. D. Whitney.*

612. Hodgson, Robert W. **An avocado monstrosity.** California Citrograph 5: 14–15. *1 fig.* Nov., 1919.—Author describes seedling with the leaves near the apex of main stem remarkably malformed, consisting of irregular masses of white fleshy tissue. No evidence of injury by insects or fungi; bud mutation suggested as possible cause of abnormality.—*Howard B. Frost.*

613. Hoffmann, Hermann. **Zum Problem der Vererbung erworbener Eigenschaften. [The problem of inheritance of acquired characters.]** Med. Klinik 15: 583–586.

614. Holländer, Eugen. **Familiäre Fingermissbildung (Brachydaktylie und Hyperphalangie). [Familial abnormalities of the fingers (brachydactyly and hyperphalangy).]** Berlin Klin. Wochenschr. 55: 472–474. 1918.

615. Hollick, A. **The story of the Bartram oak.** Sci. Amer. 121: 422, 429–430, 432. *6 fig.* 1919.—The Bartram oak, after 175 years of doubt and controversy, is conclusively proven to be a hybrid, with the willow oak and the red oak as the two parent species.—*Chas. H. Otis.*

616. Holmgren, I. **Zytologische Studien über die Fortpflanzung bei den Gattungen Erigeron und Eupatorium. [Cytological studies on reproduction in the genera Erigeron and Eupatorium.]** K. Svenska Vet. Akad. Handl. 59[7]: *118 p., 24 fig.* 1919.—The two nearly related species *Erigeron eriocephalus* and *E. unalaschkensis* differ from each other both in the number of chromosomes and in the evolution of the embryo sac. (All described types of evolution of the embryo sac of the Compositae are to be found in the genus *Erigeron.*)—*Erigeron annuus* is apogamous; within the genus *Erigeron* are to be found diploid, triploid, tetraploid and hexaploid species with nine chromosomes as cardinal number. These numbers and the appearance of the chromosomes is discussed in detail. Author believes that crossing has taken the greatest part in the origin of species.—*Eupatorium glandulosum* produces seeds even after castration. Eight sexual species of the same genus are also examined. The evolution of the reproductive cells is very comprehensively described for *E. glandulosum.*—The treatise is concluded with some theoretical discussions on the origin of apogamic species. Author considers that between crossing, apogamy, doubling of chromosomes, absence of conjugation of chromosomes, and absence of reduction division a certain relation exists.—He believes namely that crossing under certain circumstances may release a tendency to apogamous evolution. Even if all cases of apogamy might be related to influence of crossing, we will not on this ground obtain a real explanation of the causes of apogamy. The paper contains important compilation and discussion of literature.—*K. V. Ossian Dahlgren.*

617. Hultkrantz, J. Vilh. **Om rashygien dess förutsättningar, mål och medel. Skrifter utgifna av Svenska Sällskapet för Rashygien. I. [On eugenics, its qualifications, purposes and means. Publications edited by the Swedish Eugenical Association. I.]** *21.5 × 14.5 cm., 54 p.*

7 fig. Upsala. 1919.—In the first part of this paper are given some facts concerning heredity in general. Pedigrees of a Swedish family with polydactyly, and the "Lister" family with progressive myoclonous epilepsy are demonstrated.—In the last part author gives an account of racial qualities of the Swedish people. By examination of men in the military service he has found that the length of body is still increasing. In the year 1887 the length was in average 169 centimeters and in 1914 it was 172 cm., which means an increase of a good millimetre per annum. Mortality of children is less and average duration of life is greater than in the other countries of Europe. Author points out the difference between influence of circumstances and hereditary constitution.—The principles of practical eugenics, different kinds of contra-selection, the problem concerning increase of population from race-biological point of view, also negative and positive eugenics, are all treated in a competent and interesting manner.—*K. V. Ossian Dahlgren.*

618. Ibsen, Heman L. **Linkage in rats.** Amer. Nat. 54: 61–67. Jan.–Feb., 1920.—Presents evidence indicating that three pairs of alternative characters in rats, viz., agouti vs. black, self vs. hooded, and black-eyed vs. red-eyed, are inherited independently of each other. In crosses involving red-eye and the pair color vs. albinism, there were no crossovers among seventy gametes, agreeing well with Castle's result of one apparent crossover among 434 gametes.—*Sewall Wright.*

619. Jansky and Mysliveček. **Beitrag zur familiären amaurotischen Idiotie. [Contribution to familial amaurotic idiocy.]** Arch. Psychol. 59: 1918.

620. Jones, D. F. **Hybrid vigor and its meaning.** Sci. Amer. 121: 230–231, 239–241. *7 fig.* 1919.—At the Connecticut Agricultural Experiment Station maize has been artificially self-sterilized for thirteen consecutive years. The outstanding results have been a decided drop in productiveness of grain, a decrease in size and a lessened ability to withstand unfavorable conditions. At first, many undesirable kinds of plants were observed; but plants incapable of reproduction ceased their appearance after about 6 generations of self-fertilization, and the remaining inbred plants reached a point beyond which there was no further reduction in size and vigor or alteration in structure. In the process of inbreeding a large number of decidedly unfavorable characters are eliminated, but productiveness and general vigor are also lost. Crossing restores immediately what is lacking in this respect. If the hybrid individuals are self bred or bred among themselves, a rapid reduction in growth takes place which if persisted in will take the plants back to the level of the inbred parents which were used to make the cross. Hybrid vigor, therefore, is transitory in its effect and for the most part incapable of fixation; it results from a temporary securing of all or many of the good qualities from two diverse parents, since character factors, according to Bateson and Morgan, are carried in groups, and it is these groups of hereditary potentialities which Mendelize.—*Chas. H. Otis.*

621. Jörger, J. **Die Familie Markus. [The Markus family.]** Zeitschr. Ges. Neur. u. Psychol. 43: 76. 1918.

622. Kajanus, Birger. **Kreuzungsstudien an Winterweizen. [Studies on crossing winter wheat.]** Bot. Notiser 1918: 235–244. 1918.—Preliminary paper on genetic studies in 22 wheat crosses of pure lines from 17 different types. These types represent *dicoccum*, *spelta*, *turgidum*, and *vulgare*. Studies have been made through from 2 to 5 generations, and have included length of internode, awns, pubescence, color of glumes, number and color of kernels, inner condition of straw, and color of leaf auricles. The segregation of these characters in the various crosses is briefly described. Crossings between *vulgare* and *dicoccum* gave in the F_2 loose forms as in spelt. This spelt form reached constancy in the F_3, and when crossed with *vulgare* showed dominance of the spelt characters. Crossings between *vulgare* and *turgidum* gave in F_2, close spelt-like forms, and in some cases spikelets with more than one kernel as in *vulgare* and *turgidum*; one such constant form was crossed with *vulgare* and showed recessiveness of the spelt characters. In all crossings with *dicoccum*, *spelta*, and *turgidum*, squarehead

forms appeared as *vulgare* novelties. In certain crosses between *vulgare* types, forms more or less speltlike appeared. In this way speltlike forms with awns arose from parents without awns. Through a cross between smooth yellow *vulgare* and spelt, it was proven that hairiness and the gray-brown color of spelt depended on a single determiner, while in the case of the *vulgare* forms the results were different. In the forms heterozygotic in reference to the group types, the hairiness and the color were in each instance produced in accordance with the spike type. In the segregation the characters associated together maintained the same ratio. The ratio 3 hairy gray-brown to 1 smooth yellow appeared in these spelt-*vulgare* crosses. The other crosses are reported in a somewhat similar manner.—Author maintains that his observations justify the later classification of the 7 groups of wheat into two groups; viz., an Emmer series including *dicoccum, durum, polonicum,* and *turgidum,* and a Dinkel series including *spelta, vulgare,* and *compactum.*—*W. E. Bryan.*

623. Kalt, B. **Die Hintertuxergerste. Ein Anbau- und Züchtungsversuch. [The Hintertux barley. An experiment in culture and breeding.]** Kühn-Archiv 7: 217–240. 1918.

624. Kalt, B., and A. Schulz. **Über Rückschlagsindividuen mit Spelzweizeneigenschaften bei Nacktweizen der Emmerreihe des Weizens. [Concerning the occurrence of atavism in wheat—in the naked wheat of the Emmer type occur individuals with characters of the Spelt type.]** Ber. Deutsch. Bot. Ges. 36: 669–671. 1918.—The naked wheats have probably arisen from the Spelt type and consequently one might expect the occasional appearance of individuals with the Spelt characters. That this is actually the case is shown in the new Elephant variety—a *Triticum turgidum* type—where individuals appear which exhibit the brittleness of head-axis, a typical character of the Emmer wheat.—*Ernst Artschwager.*

625. Kammerer, Paul. **Vererbung erzwungener Formveränderungen. 1. Die Brunftschwiele des Alytes-Männchen aus "Wassereiern." [Inheritance of induced changes of form. 1. The callosities of the Alytes males from "water-eggs."]** Arch. Entwicklungsmech. Org. 45: 323–370. *Pl. 10–11.* 1919.—*Alytes obstetricans* was forced to lay its eggs in water by raising the temperature at the breeding time to between 25° to 30°C. At first, most of the eggs died; but in later generations more and more of the young survived. After six generations, disease carried off the progeny. The numbers were small. In the third generation distinct rough pigmented callosities were first noted on the manus of males during the breeding season. In following generations specimens were obtained with more distinct callosities, even extending to the forearm. Some which were tested kept this character for several generations without being subjected to heat at the breeding period. Only a trace of these transitory callosities was found in the wild male *Alytes.* Some of the females of the "water-egg" line even showed as much in the breeding season as did these wild males. Animals which had shown the callosities did not lose them after castration.—*John Belling.*

626. Keilin, D., and G. H. F. Nuttall. **Hermaphroditism and other abnormalities in Pediculus humanus.** Parasitology 2: 279–328. *Pl. 12–17, 28 fig.* Oct., 1919.—About one hundred and fifty hermaphroditic lice from wild and laboratory cultures were examined in detail and yielded a complete series of forms ranging from the male type to the female type, the coexisting characters of both sexes being present to a varying degree. The development of the gonads were not necessarily accompanied by the appropriate secondary sexual organs. The anatomical structure of the hermaphrodites indicated that they may have been either sexually non-functional or functional. Wild races contained from 0.2 to 8 per cent of hermaphrodites while crosses between *P. capitis* and *P. corporis* yielded in some experiments over 20 per cent. In the crossing experiments a great diminution in the proportion of females to males was observed.—*D. D. Whitney.*

627. Kihara, Hitoshi. **Über cytologische Studien bei einigen Getreidearten. [Cytological studies of some cereal crosses.]** Bot. Mag. Tōkyō 33: 21–38. *21 text fig.* 1919.—Root tips, anthers, and ovaries were treated for 1–2 minutes in Carnoy's solution with chloroform and then in Flemming's solution for 24 hours. The hybrids were produced by crossings

Triticum durum, *T. turgidum*, and *T. polonicum*, female plants with 14–28 chromosomes with *T. vulgare*, *T. compactum*, and *T. spelta*, with 21–42 chromosomes, F_1 root tips gave uniformly 35 chromosomes. The prophase is apparently of the usual type, bivalent chromosomes probably arising by the formation of post-synaptic loops. Heterotypic metaphase shows 14 bivalent and 7 univalent chromosomes. The 14 pairs separate and the 7 singles split longitudinally, giving 21 at each pole. In the second division the 14 undergo the usual equational split but the 7 are distributed somewhat tardily to one pole or the other or occasionally one or more left out of the daughter nuclei. Pollen nuclei thus contain $14 + x$ ($x = 0$ to 7) chromosomes with 17 or 18 most usual. Excluded chromosomes form chromatin nucleoli, which degenerate before maturity of the pollen. Of 5 F_2 plants 4 showed 38 and one 35 chromosomes in somatic mitoses. One F_4 plant showed a single preparation with five figures, each showing clearly 41 chromosomes. Somatic counts in a wheat-rye hybrid of the fifth generation (back-crossed to the wheat) gave counts of 42 like the F_1 in some cases but of only 38 in other plants grown from seed from the same ear as the first. The author promises to attempt to discover the relation of these cytological facts to the breeding behavior of these most interesting hybrids.—*Leonas L. Burlingame.*

628. Kihara, Hitoshi. **Ueber cytologische Studien bei Getreidearten. Mitteilung II. Chromosomenzahlen und Verwandtschaftsverhältnisse unter Avena-arten. [Cytological studies in the cereals. II. Chromosome counts in reference to the relationship of oat species.]** Bot. Mag. Tokyo **33**: 94–97. *2 fig.* 1919.—See Bot. Absts. 3, Entry 1939.

629. Killer, J. **Über die Umzüchtung reiner Linien von Winterweizen in Sommerweizen. [Concerning the changing over of pure lines of winter wheat into spring wheat.]** Jour. Landw. **67**: 59–62. 1919.—See Bot. Absts. 4, Entry 87.

630. King, Helen D. **Studies on inbreeding. IV. A further study of the effects of inbreeding on the growth and variability in the body weight of the albino rat.** Jour. Exp. Zoöl. **29**: 71–111. *8 fig.* Aug. 20, 1919.—Presents data on the growth curves and variability of two strains of albino rats in the 16th to 25th generation of brother-sister mating, together with similar data for a control stock. All stocks showed a reduction from previous years in rate of growth and maximum weight, due wholly, it is believed, to unfavorable environmental conditions. The inbreds continue to be heavier than controls of the same age raised under the same conditions. There is no indication that inbreeding has caused a change in the form of the growth curve or the relative weights of the sexes. Growth curves for two independent inbred lines are nearly identical. As before, the coefficient of variation for the weight increases up to 60 days, decreases to three hundred days and then increases as some of the rats begin to fatten. Males as usual are more variable than females. Inbreds remain less variable than controls, but are more variable than earlier inbreds. Similar increase in variability of controls indicates that environmental conditions are responsible.—*Sewall Wright.*

631. Klatt, B. [Rev. of: Steche, O. **Grundriss der Zoologie. (Foundation of zoology.)** *508 p.* Veit. u. Co.: Leipzig. 1919.] Zeitschr. indukt. Abstamm. Vererb. **22**: 53–55. Dec., 1919.

632. Klatt, B. [Rev. of: Stieve, H. **Über experimentell, durch veränderte äussere Bedingungen hervorgerufene Rückbildungsvorgänge am Eierstock des Haushuhnes (Gallus domesticus). (On reversional processes in domestic fowl produced experimentally by changed external conditions.)** Arch. Entwicklungsmech. **44**: 1918.] Zeitschr. indukt. Abstamm. Vererb. **22**: 57–58. Dec., 1919.

633. Klatt, Berthold. **Keimdrüsentransplantationen beim Schwammspinner. Ein experimenteller Beitrag zur Frage der Vererbbarkeit erworbener Eigenschaften. [Germ-cell transplantation in Lymantria. An experimental contribution to the question of inheritance of acquired characters.]** Zeitschr. indukt. Abstamm. Vererb. **22**: 1–50. Dec., 1919.

634. Klebahn, [H.]. [Rev. of: Davis, Bradley Moore. Hybrids of Oenothera biennis and Oenothera franciscana in the first and second generation. Genetics 1: 197–221. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 138–140. July, 1919.

635. Klebahn [H.]. [Rev. of: Stomps, Theo. J. Über den Zusammenhang zwischen Statur und Chromosomenzahl bei den Onotheren. (On the correlation between stature and chromosome number in the Oenotheras.) Biol. Centralbl. 36: 129–160. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 140–142. July, 1919.

636. Kooiman, H. N. Over de beteekenis van het kruisen van individuen, behoorend tot verschillende Linné'sche soorten, voor het ontstaan onzer huisdieren. [On the significance of crossing of individuals belonging to different Linnean species, for the origin of our domestic animals.] Ardea 7: 108–114. 1918.—The fertility of hybrids between different Linnean species is generally denied or doubted; Darwin thought hybrids between species of Gallus infertile, as did many fowl-breeders in later years. Experiments in crossing the Linnean species *Gallus bankiva* with *G. sonnerati* and *G. bankiva* with *G. furcatus*, made by Houwink at Meppel, have shown to the writer the occurrence of fertile hybrids between these species, the fertility being of course somewhat more limited than in "pure" individuals. But the principal result is, that the hybrids are fertile, that functioning gametes are being formed by the F_1 animals and that vital F_2-animals may be obtained. Perhaps the results of these experiments show us the possibility of obtaining anew various races of domestic fowl by cross-breeding the wild Linnean species and thus to build their genealogical tree in a sense, not Lamarckian or Darwinian or deVriesian, that supposes all only one Linnean species as the ancestor of our domestic animals, but in a sense of crossing: two or more Linnean species may have contributed to the origin of our domestic varieties.—*M. J. Sirks.*

637. Krause, K. [Rev. of: Raunkiaer, C. Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. (On the concept of elementary species in the light of modern genetical investigations.) Zeitschr. indukt. Abstamm. Vererb. 19: 225–240. *2 fig.* 1918. (See Bot. Absts. 2, Entry 41).] Bot. Jahrb. 55: 68. 1919.

638. Krüger. [Rev. of: Cockayne, E. A. "Gynandromorphism" and kindred problems. Jour. Genetics 5: 75–131. *Pl. 21–24.* 1915.] Zeitschr. indukt. Abstamm. Vererb. 22: 55–57. Dec., 1919.

639. Kuiper, [K.] [Rev. of: Schmidt, Johs. Racial studies in fishes. I. Statistical investigations with Zoarces viviparus L. Jour. Genetics 7: 105–118. 1918.] Genetica 1: 557–558. Nov., 1918.

640. Kuttner, O. [German rev. of: Ekman, Sven. Studien über die marinen Relikte der nordeuropäischen Binnengewässer. II. Die Variation der Kopfform bei Limnocalanus grimaldii (de Guerne) und L. macrurus (G. O. Sars). (Studies on the marine relicts of north European inland waters. II. The variation of the headform in Limnocalanus grimaldii (de Guerne) and L. macrurus (G. O. Sars). Intern. Rev. d. ges. Hydrobiol. u. Hydrographie 6: 1913.] Zeitschr. indukt. Abstamm. Vererb. 21: 181–182. Sept., 1919.

641. Kuttner, O. [German rev. of: Hartmann, Otto. Über das Verhältnis von Zellkern und Zellplasma bei Ceratium und seine Bedeutung für Variation und Periodizität. (On the relation between nucleus and cytoplasm in Ceratium and its significance for variation and periodicity.) Arch. Zellforsch. 14: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 182–183. Sept., 1919.

642. Kuttner, O. [German rev. of: Heuscher, H. Das Zooplankton des Zürichsees mit besonderer Berücksichtigung der Variabilität einiger Planktoncladoceren. (The zooplankton of Zurich lake with special reference to the variability of some plankton Cladocera.) Arch. Hydrobiol. Planktonkunde 11: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 180–181. Sept., 1919.

643. Kuwada, Y. **Die Chromosomenzahl von Zea Mays L. Ein Beitrag zur Hypothese der Individualität der Chromosomen und zur Frage über die Herkunft von Zea Mays L. [The chromosome-number of Zea mays L. A contribution to the hypothesis of the individuality of chromosomes and to the problem of the origin of Zea mays L.]** Jour. Coll. Sci. Imperial Univ. Tôkyô 39: 1-148. *2 pl., 4 fig.* Aug., 1919.—Haploid chromosome-number, in starchy maize as "Black Starch," "Amber Rice Pop Corn," "Black Mexican," is 10, and fluctuates rarely into 7, 8, 9, while that in sugar-maize, or "Sugar Corn," is 12, and fluctuates very often into 9, 10, 11, 13, or 14; the diploid number which was studied in the root-tips, is generally 20. In some races of sugar-maize author finds that the chromosome-number in the root-tips is variable in different individuals of one and the same race, for it is sometimes 20, 21, 22, sometimes 23, 24; in such cases the haploid number is correspondingly variable and is 10,11 or 12. On the basis of comparative studies on the number and length of pairs and the length of chromosomes in the root-tip author comes to the conclusion that the number of chromosomes in a nucleus may increase by the transverse division of some of them, thus, for example, 24 chromosomes are equal to 20 entire ones + 4 fractional, which were produced by transverse division of each of the remaining chromosomes into two. Further, author has found that *Euchlaena* has 10 (haploid) and 20 (diploid) chromosomes which are long, and also that *Andropogon* has the same number of chromosomes which are distinguished by their shortness; in the nuclei of maize there are found two types of chromosomes, long and short, so that chromosomes which are apparently homologous may be of different lengths and even one and the same pair is sometimes composed of two chromosomes of different lengths. From all these facts author thinks as does Collins that *Zea Mays* was originally derived from the hybridization between *Euchlaena* and some unknown species of the tribe Andropogoneae, long chromosomes belonging to the former and short ones to the latter, and that the nuclei of its various individuals possess both kinds of chromosomes in various combinations according to the law of chance. As both *Euchlaena* and *Andropogon* have 10 chromosomes as haploid number, their original number in *Zea Mays* will be 10, 12, etc., being derived from 10. The chromosomes derived from *Euchlaena* (long) have the tendency to undergo the transverse division, so that in synapsis each such chromosome either presents itself as two fractional ones or remains single and retains that tendency, while those derived from *Andropogoneae* (short) have no such tendency at all and remain always single. When in synapsis the two fractional chromosomes of *Euchlaena* origin derived from one chromosome by transverse division on one side and a single one of the same origin retaining the tendency of dividing on the other happen to form together a geminus, the single one is generally compelled to divide transversely into two by the influence of the fractional companions, so that in such case the two fractional chromosomes may be said to be "dominant" to the single one, though sometimes exceptions may occur; the number of chromosomes is therefore variable in different cases. When, on the contrary, the two fractional chromosomes come to form a geminus together with a single one originating from Andropogoneae having no tendency to divide, the former are always compelled to fuse to each other, end to end, owing to the influence of the latter, so that in all such cases the former may be said to be "recessive" to the latter; the chromosome-number is always constant in such cases. The variability of the chromosome-number, haploid as well as diploid, in various individuals, even in one and the same race, may be easily comprehensible, because there will be according to individuals different modes of combinations of different gemini as the consequence of fertilization, which are considered in detail by author. Author also discusses various cytological and genetical subjects.—*S. Ikeno.*

644. Küster, Ernst. **Über weissrandige Blätter und andere Formen der Buntblättrigkeit. [On white-margined leaves and other forms of variegation.]** Biol. Zentralbl. 39: 212-251. *27 fig.* May, 1919.—Variegated leaves and shoots having green and colorless areas more or less sharply delimited are divided into three groups: marginal, sectorial, and mottled or pulverulent variegation. Consideration is given primarily to marginal variegation which is divided into four types: (1) *Pelargonium zonale* type, with green leaves having a white border of varying width around the entire leaf. (2) *Saxifraga sarmentosa* type, green leaves with a white margin but on the margin is a sprinkling of small green areas. (3) *Spiraea bumalda* type,

shoots which produce intermittently green and variegated leaves. The variegated leaves are pale green with white margins and have relatively large green sectors. (4) *Sambucus nigra* type, white margined leaves that have a deep green central field and a pale green zone of varying width between the central field and margin. The author states that pure albino shoots do not exist. Sooner or later such shoots produce leaves which have very small areas of green, especially beneath the lower epidermis. Variegated leaves that have the arrangement of the colored and colorless areas in the above types inversed are referred to as inverse variegation. Author points out that Baur's explanation cannot account for isolated green areas in the margin of leaves having the *Saxifraga sarmentosa* type of variegation, and that it cannot at all explain the *Spiraea bumalda* type. He suggests that the phenomena of variegation can be most simply explained by assuming reversible somatic mutations, somewhat analogous to Beyerinck's variegated race of bacteria, *Chlorella variegata*. It was observed (1) that the frequency of mutation and subsequent development of variegation differs in the various families and genera of plants, (2) that the frequency of mutation of cells at the growing point differs at different stages of the shoot's growth, (3) that cells in different parts of the same leaf blade do not mutate with the same frequency, and (4) that when variegated shoots are cut back variegation is much more pronounced in the regenerated shoots.—*W. H. Eyster.*

645. Laughlin, H. H. **The relation between the number of chromosomes of a species and the rate of elimination of mongrel blood by the pure-sire method.** Proc. Soc. Biol. and Med. 16: 132–134. 1919.—The degree of elimination of mongrel "blood" by the pure-sire method depends upon (a) the number of chromosomes characteristic of the species, (b) the proportion of mixed dams of each possible pure chromosome-number used in each generation, (c) the relative fecundity of dams of different pure chromosome-number, and (d) the number of generations through which the system is carried. The probabilities of mongrel blood being entirely eliminated in any given individual in generations one to ten in such a system, with the calculations based on certain assumptions, are stated.—*C. B. Hutchison.*

646. Lebius, Franz. **Familienforschung.** [**Genealogical investigation.**] *34 p.* H. A. L. Degener: Leipzig. 1918.

647. Lehmann, Ernst. **Die Pentasepalie in der Gattung Veronica und die Vererbungsweise der Pentasepalen Zwischenrassen.** [**Pentasepaly in the genus Veronica, and the manner of inheritance of the eversporting varieties of the penta-sepalous forms.**] Ber. Deutsch. Bot. Ges. 36: 28–46. *Fig. 2.* 1919.—In crossing the penta- and tetra-sepalous *Veronica Corrensiana* with the penta-sepalous *V. tubingensis* we get in the F_1 generation between 71 and 98 per cent penta-sepalous flowers. If we cross the tetra-sepalous *V. Aschersoniana* with the penta-sepalous *V. tubingensis* we get in the F_1 generation between 3 and 23 per cent penta-sepalous flowers, that is, a dominance of the tetra-sepalous form, pentasepaly in the first case being dominant, in the second case recessive. In the F_2 generation we get a large percentage of tetra-sepalous flowers. By crossing them, a nearly pure pentasepalous form with a nearly pure tetra-sepalous one, we get intermediate races—*eversporting varieties*—the condition becoming more complex because of the change in dominance. In the Scrophulariaceae, there are many members which show inhibition in the development on the dorsal side of the flower primordium with a corresponding increase in growth on the proximal side. This inhibition in growth may lead to a complete reduction of the distal median calyx lobe. In the genus *Veronica*, this latter condition is nearly reached. Some forms show only a slight reduction and in that case we do not get change from penta- to tetra-sepaly upon crossing; that is, intermediate races do not appear. Other forms, such as *V. tubingensis* and some *Teutricum* races, are intermediate. Another extreme is found in *V. Corrensiana* and *V. Aschersoniana*, where penta-sepaly occurs only occasionally. Both extemes of phylogenetic development may be connected by crossing; but the condition becomes complex because of the appearance of intermediate races with a fluctuation in dominance of penta-sepaly and tetra-sepaly.—*Ernst Artschwager.*

648. Little, C. C. **Colour inheritance in cats, with special reference to the colours black, yellow and tortoise-shell.** Jour. Genetics 8: 279–290. Sept., 1919.—Author attempts to explain nature of sterile and fertile tortoise-shell males and anamalous occurrence of blacks. Hypotheses of Ibsen, Wright, Doncaster, and Whiting are reviewed and criticized. Mutation of yellow to black in parents accounts for anomalous black offspring. Tortoise-shell males may result from non-disjunction, the sterile being "near males."—*P. W. Whiting.*

649. Little, C. C. **Human sex-ratio.** Proc. Soc. Exp. Biol. and Med. 16: 127–130. 1919. —From the records of the Sloane Lying-In Hospital, New York City, of 7058 births, 5753 of them progeny of pure racial matings of eight different European races, and 1305 progeny of hybrid matings among these same races, author determined sex ratios and found a higher percentage of males to females in hybrids than in pure stocks, 121.56 ± 2.06 for hybrids, and 106.27 ± 0.91 for pure stock. This is same result as that obtained by Pearl in 1908 using data of Buenos Ayres including 219,516 births, though each ratio is higher than the corresponding one in the South American data which gave a ratio of 105.99 ± 0.39 for hybrids and 102.21 ± 0.16 for pure stock. Since Pearl's data did not take still-births into consideration and it was not known what effect that might have on the result, Little tabulated still-births separately, but found that their sex ratios are not significantly different from those obtained for live-births or for all births together. He found also a lower percentage of still-births in the hybrids than in the pure stock, 3.98 ± 0.36 in hybrids and 6.17 ± 0.21 in pure stock, indicating that hybrids in man tend to show the vigor characteristic of hybrids in other animals.—*Sylvia L. Parker.*

650. Little, C. C., and E. E. Jones. **Inheritance of coat color in Great Danes.** Jour. Heredity 10: 309–320. *Fig. 12.* Oct., 1919.—The authors give a brief historical sketch of the breed and a description of the color varieties. A review of previous literature follows in which the behavior of color factors of other breeds is compared to instances occurring in Great Danes. Assuming that Great Danes are a mixed population, characteristic ratios are given for random matings using dilute and intense pigmentation. Observed experimental results are based upon data derived from the American Kennel Club Stud Books, Volumes 11 to 34 inclusive. A detailed analysis of the inheritance of various color factors leads to the following conclusions: (a) There is a single Mendelizing factorial difference between intense pigmented varieties and the dilute varieties. The factor for intensity being epistatic to its allelomorph. (b) The three coat conditions, black, brindle, and fawn are dependent upon three mutually allelomorphic factors: E for full extension of black pigment, E' for partial extension (the brindle pattern), and e' for its restriction to the muzzle, nose, and feet. The allelomorphs being $E\ E$, $E\ E'$, or $E\ e'$; $E'\ E'$, $E'\ e'$; and $e'\ e'$: (c) Harlequin spotting (H) is epistatic to solid coat color (h); (d) The rare appearance of minute-white-spotted individuals of a progeny of solid colored animals is probably due to a factor (s) which is hypostatic to its allemorph (S) for self coat color.—*Maxwell J. Dorsey.*

651. Loeb, Leo. **The individuality-differential and its mode of inheritance.** Amer. Nat. 54: 55–60. Jan.–Feb., 1920.—Individuality-differential is a chemical characteristic which is same for all tissues of one individual but different for different individuals. Inheritance of differential has been tested in rats and guinea-pigs by transplantations from parents to children, children to mother, and brothers to brothers. Differentials of children are intermediate between those of parents, but very variable. Probably those of F_2 are also intermediate. Author suggests that individual has two sets of differentials, one from each parent, and each set consists of two kinds of differentials. Differentials are supposed to be related to composition of chromosomes and to involve side-chains of proteins.—*A. Franklin Shull.*

652. Lotsy, J. P. **Mutatie of kruising, de oorzaak der evolutie? (Mutation from crossing the cause of evolution?)** Nederl. Tydschr. Geneeskunde 17[2]: 1395–1404. 1918.—In organic matter form is always the result of a process of crystallization; per analogon to this in organic beings also the form building results from a perpetual arrangement of the composing parts according to their form. This analogon is allowed and defended with fol-

lowing arguments: (1) The plasma may increase, though only dead material is given to it as nurture, while pangens are supposed to be "living" things.—(2) If this is not yet the case, then the organism analyses all food material into simple groups of molecules and abolishes all traces of organised structure.—On these grounds the writer denies the existence of living "genes," "pangenes," or how these living particles may be called and accepts only molecules as building stones for the organism. To go more into details in these questions, the author thinks it thoroughly useless, because of our ignorance about the simplest processes of formbuilding in living material. For instance the problem of the real nature of the zygote in animals. This zygote is generally accepted to be a double-cell, resulting from equivalent parts, one from the father, one from the mother. But these parts are really not equivalent. First, the zygotic plasm is only supplied by the mother; the zygote therefore is not a double-cell, but a simple cell with a double-nucleus. According to the conceptions of Schaxel, the zygotes have only one kind of plasma and two kinds of nuclei; along these lines the difference of reciprocal crosses as observed in some cases, may perhaps be explained.—Even if by experimental researches the alternative "mutation or crossing, cause of evolution" were decided in one or the other direction, then our explanation of the evolutionary process would only have begun. The significance of nucleus and plasm and their interrelation will remain a further problem to be solved. Perhaps the study of Oenotheras (nucleus-chimaeras as the author calls them) will bring us still many new facts in this direction.—*M. J. Sirks.*

653. Lotsy, J. P. [Dutch rev. of: Anonymous. Wanted, photographs of twins. Jour. Heredity 9: 262. Oct., 1918. (See Bot. Absts. 2, Entry 232.)] Genetica 2: 89–90. Dec., 1920.

654. Lotsy, J. P. [Dutch rev. of: DeVries, Hugo. Twin hybrids of Oenothera Hookeri T. and G. Genetics 3: 397–421. Sept., 1918. (See Bot. Absts. 3, Entry 2111.)] Genetica 2: 88–89. Jan., 1920.

655. Lotsy, J. P. [Dutch rev. of: Duerden, J. E. Absence of xenia in ostrich eggs. Jour. Heredity 9: 243–245. Oct., 1918. (See Bot. Absts. 1, Entry 1479.)] Genetica 2: 54. Jan., 1920.

656. Lotsy, J. P. [Dutch rev. of: Embody, G. C. Artificial hybrids between pike and pickerel. Jour. Heredity 9: 253–256. *Fig. 4–5.* Oct., 1918. (See Bot. Absts. 2, Entry 25.)] Genetica 2: 59–60. Jan., 1920.

657. Lotsy, J. P. [Dutch rev. of: Ness, H. Hybrids of the live oak. Jour. Heredity 9: 263–268. *Fig. 6–8.* Oct., 1918.] Genetica 2: 77–78. Jan., 1920.—See Bot. Absts. 1, Entry 1275.

658. Lotsy, J. P. [Dutch rev. of: Pearl, Raymond. Some commonly neglected factors underlying the stock breeding industry. Ann. Rept. Maine Agric. Exp. Sta. 1917: 1–28. 1917.] Genetica 2: 79. Jan., 1920.

659. Lotsy, J. P. [Dutch rev. of: Pearl, Raymond. The experimental modification of germ cells. I. General plan of experiments with ethyl alcohol and certain related substances. Jour. Exp. Zool. 22: 127–164. Jan., 1917.—*Ibid.* II. The effect upon the domestic fowl of the daily inhalation of ethyl alcohol and certain related substances. *Ibid.* 165–186. Jan., 1917.—*Ibid.* III. The effect of parental alcoholism, and certain other drug intoxications upon the progeny. *Ibid.* 241–310. Feb., 1917.] Genetica 2: 79–80. Jan., 1920.

660. Lotsy, J. P. [Dutch rev. of Pearl, Raymond. On the differential effect of certain calcium salts upon the rates of growth of the two sexes of the domestic fowl. Science 44: 687–688. No. 10, 1916.] Genetica 2: 78. Jan., 1920.

661. Lotsy, J. P. [Dutch rev. of: Popenoe, P. Will morality disappear? Jour. Heredity 9: 269–270. Oct., 1918. (See Bot. Absts. 2, Entry 259.)] Genetica 2: 81. Jan., 1920.

662. Lotsy, J. P. [Dutch rev. of: Shamel, A. D. **Why navel oranges are seedless.** Jour. Heredity 9: 247–249. *2 fig.* 1918.] Genetica 2: 83–84. Jan., 1920.

663. Lotsy, J. P. [Dutch rev. of: Tjebbes, K. **Sur les Rapports génétiques entre Thaumalea picta et Thaumalea obscura Schlegel. (On the genetical agreement between Thaumalea picta and Thaumalea obscura Schlegel.)** Arch. Néerland. Sci. 3: 316–323. 1917.] Genetica 2: 87–88. Jan., 1920.

664. Lotsy, J. P. **De Oenotheren als kernchimeren. [The Oenotheras as nuclear chimeras.]** Genetica 1: 7–69. 1919.

665. Lotsy, J. P. **Cucurbita-Strijdvragen. De soortquaestie. Het gedrag na kruising. Parthenogenese? [Controversial questions concerning Cucurbita. The species question. The behavior after crossing. Parthenogenesis?]** Genetica 1: 497–531. Nov., 1919.

666. Löhlein, M. **Die Begriffe "Konstitution" und "Disposition." [The concepts "constitution" and "disposition."]** Mediz. Klinik. 1918.

667. Lund, David. **Über die Ursachen der Jugendasozialität. Kriminalpsychologische und soziale Untersuchungen mit Einschluss von Familienforschungen in Schweden. [On the causes of youthful delinquency. Criminal-psychological and social investigations with inclusion of family-studies in Sweden.]** *16 × 25 cm., iv + 358 p., 21 fig., 1 general table.* Inaugural-Dissertation. Upsala, 1918.—Author has made it his principal object to study the causal importance of heredity and environment as influencing the criminality of youth. His principal material consisted of boys sentenced to forced education at a Swedish establishment Hall. Anthropometrical measurements show the delinquent youths often to be of very mixed race. For instance 33.7 per cent are brachycephalous and 9.7 per cent brown-eyed, whereas the numbers for the whole population of Sweden are 13.0 and 4.5 per cent respectively. A minute account is given of the ascendence, surroundings, physical and psychical state of a great many individuals. It appears from these family inquiries that the delinquency must be to very great measure hereditarily founded, although the surroundings may of course also play a great part. The number of imbecile and psychopathic individuals is many times larger among boys grouped on basis of heredity, than among those whose delinquency is attributable to environment. The comprehensive memoir finished with a chapter on future policy of treatment of criminality with reference especially to that of youth. The author lays stress among other things on the necessity of prophylactic measures against the propagation of hereditarily burdened individuals. The investigation shows that the number of children is smaller in the families where anomalies of one kind or another are comparatively rare, than in those where the frequency of inferiorities is greater.—*K. V. Ossian Dahlgren.*

668. Lundborg, H. **Rasbiologiens ställning som medicinskt vetenskapligt fack och dess betydelse för kulturen i allmänhet. [The place of racial biology as a discipline of scientific medicine and its importance for culture in general.]** Hygienisk Revy Lund **1918**: 48–50. April 15, 1918.—Author insists upon the founding in Sweden of a state institute of racial biology.—*K. V. Ossian Dahlgren.*

669. Macfarlane, J. M. **The causes and course of evolution.** *875 p.* Macmillan Co.: New York, 1918.

670. Mackie, D. B. **Notes on a navel variety of the Satsuma orange.** California Citrograph 4: 20–21. Nov., 1918.—Writer repeatedly observed navel marking on Satsuma fruits in Japan, and obtained a summary of a Japanese paper by A. Kikuchi, entitled The appearance of the navel mark on the Satsuma orange.—According to Kikuchi the navel mark is small, affects only the rind, and appears on only part of the fruits on a tree. A statistical study of fruits indicates that navel fruits are larger, heavier, and more oblate than normal fruits from the same tree. [See Bot. Absts. 2, Entry 55.]—*H. B. Frost.*

671. Malthouse, G. T. **Seedling potatoes.** Gard. Chron. 66: 291. Dec. 6, 1919.—Refers to previous article by Fred J. Chittenden, and gives further examples of seedling potatoes that were apparently identical to previously introduced varieties.—*Fred A. Krantz.*

672. Mandekic, V. **Prilog gojidbi Kukuruza. [Contributions to the breeding of maize.]** Gospodarska smotra 1918: 1–4. 1918.

673. Mandekic, V. **Nesljectivonje nikih divjstore Kost Kulkuruza. [Inheritance of several characters in maize.]** Gospodarska smotra 1918: 5–8. 1918.

674. Mathieu, E. **Acclimatisation trials of lima beans (Phaseolus lunatus).** Gardens' Bull. Straits Settlements 2: 121–129. 1919.—See Bot. Absts. 4, Entry 97.

675. Mayer-Gmelin, H. **Mededeelingen omtrent enkele kruisings en veredelingsproefnemingen. [Reports on several experiments in crossing and selection.]** Cultura 30: 1–19. *4 pl.* 1918.—The paper gives three reports about experiments in crossing and selection: 1. Natural hybridizations in beans; 2. Natural hybridizations in wheat and spelt; 3. Selection in rye and the difference in result of selfing between different plants of rye.

1. In a previous paper the writer published some researches about crossbreeding of beans; his experiments in 1916 and 1917 were made in this manner, that two plants of different races were isolated together in one cage, humble-bees were brought therein to obtain if possible hybrids between these plants. The experiments failed; while in the posterity of the freely flowering plants spontaneous hybrids were observed, sometimes in 2 per cent the plants isolated in cages did not yield any hybrid. The cause of this failure is still unknown.

2. Spontaneous hybridization in wheat results not only, if different races of wheat are grown in the vicinity of each other, but also if wheat is grown near spelt. The difference of sensibility for crossing, already observed by Nilsson-Ehle, was also remarkable in the writers cultures; his experiments gave besides spontaneous crossings between wheat varieties also between wheat and spelt. The maximum of such crossings between races of wheat was found to be 0.87 per cent, between wheat and spelt 0.43 per cent. Self fertilization is far the most important in wheat, but crossing sometimes happens especially in the earlier races.

3. Selection in rye has shown that between different plants of rye a great difference exists regarding sensibility for selfing. Some isolated plants have only empty ears, others contained a more or less important number of grains. By selection along these lines breeding of selfing races of rye will be possible.—*M. J. Sirks.*

676. M[ayor], A. G. [Rev. of: Crampton, Henry Edward. **Studies on the variation, distribution, and evolution of the genus Partula. The species inhabiting Tahiti.** Carnegie Inst. Washington Publ. 228. *313 p., 34 pl., 7 fig.* Jan., 1917.] Science 51: 142–143. Feb. 6, 1920.

677. Meunissier, A. **Expériences génétiques faites à Verrières. [Genetical experiments made at Verrières.]** Bull. Soc. Nation. Acclimat. France 1918: 1–31. 1918.—Résumé of the genetic work at Verrières-le-Buisson under the direction of Philippe de Vilmorin from 1902 to 1914. References to other genetic work are intermingled.—In *Pisum*, the parchment of the pod, the form of the pod, the bloom on the plant, adherence of the seeds, absence of tendrils, number of flowers on the peduncle, and the colored eye of the seed, have been especially studied. A commercial pea without tendrils has been raised.—In *Triticum*, the color and branching of the ear, supernumerary spikelets, and height of plant, have been attended to. A dominant dwarf, existing only as a heterozygote; and a distinct maternal influence on the height of the F_1 generation, have been found. New wheats have been raised for the Balkans, Algeria, Argentina, and Chile. In the last three cases, the best varieties of the country were crossed with high-yielding European kinds.—With *Avena* a secular experiment has been started, by growing the same 4 constant strains in England, Sweden, Germany, Holland and France.—In *Hordeum*, a recessive strain with smooth awns is considered useful in some cases.—Species crosses were studied in several genera. In *Argemone*, double flowers and

plants with some stamens transformed into carpels resulted. Species crosses of *Digitalis*, and of *Gladiolus*, were also noteworthy.—In dogs, (*Canis*), tailless and short-tailed strains were crossed with normals, and all the abnormals were found to be heterozygous. Length of paws, and blackness of tongue, were also considered.—A bibliography of the work at Verrières is added.—*John Belling.*

678. Michael, Ellis L. **Concerning application of the probable error in cases of extremely asymmetrical frequency curves.** Science **51**: 89–91. Jan. 23, 1920.—This paper suggests that in cases of extremely asymmetrical frequency curves, the proper method of treatment is to find some function of the measurements whose frequency distribution is Gaussian, and apply the probable-error calculation to that function. In the illustration used (successive bacterial counts from muscle emulsion made from five muscles of pollution area) the scale used is changed from the frequency of the actual counts to the frequency of the logarithms of the actual counts. This change makes the asymmetrical frequency Gaussian. The calculations are made on this frequency and the results when complete converted back to the actual figures of the experiment.—*John W. Gowen.*

679. Miller, Edwin C. **Development of the pistillate spikelets and fertilization in Zea mays L.** Jour. Agric. Res. **18**: 255–266. *Pl. 19–32.* Dec. 1, 1919.—Fertilization occurs 26 to 28 hours after pollination. Although many pollen tubes started down a style at one time only one reached the ovary cavity in 100 observations.—*D. F. Jones.*

680. Milliken, C. S. **Handling of select citrus buds.** California Citrograph **3**: 73. *1 diagram.* Feb., 1918.—Describes work of Fruit Growers' Supply Company in furnishing bud wood from trees of known high productiveness.—*Howard B. Frost.*

681. Milliken, C. S. **Importance of having best type of citrus trees.** California Citrograph **3**: 277. Sept., 1918.—Popular, brief.

682. Milliken, C. S. **Importance of using reliable citrus trees in new plantings.** California Citrograph **4**: 158, 171. Apr., 1919.—Popular.

683. Miyoshi, Manabu. **Über der Erhaltung einer neuen wildwachsenden hängenden Varietät des Kastanienbaumes als Naturdenkmal. [Concerning a new wild chestnut with weeping branches and its preservation as a natural monument.]** Bot. Mag. Tôkyô **33**: 185–188. *1 photo.* Sept., 1919.—See Bot. Absts. 4, Entry 452.

684. Moeli, C. **Über Vererbung psychischer Anomalien. [On inheritance of psychic anomalies.]** Deutsche med. Wochenschr. 1918.

685. Molyneux, E. **Fasciation not inherent.** Gard. Chron. **64**: 210. *1 fig.* Nov. 23, 1918.—In a number of cases wheat plants bearing a "double" (bifurcated) terminal spike shows no perpetuation of this abnormality in succeeding generations. The illustration given indicates that a fasciation is not involved.—*T. H. Goodspeed.*

686. Mottier, D. M. **Chondriosomes and the primordia of the chloroplasts and leucoplasts.** Ann. Botany **32**: 91–114. *1 pl.* Jan., 1918.—Chondriosomes and plastids morphologically unrelated. Exact function of former unknown. Both are permanent organs and concerned in hereditary transmission; "they must occur in the cytoplasm of both gametes in all plants." Even anthocyanins may be inherited through some such extra-nuclear mechanism.—*Merle C. Coulter.*

687. Nagai, Isaburo. **The correlation in the differentiation of sex in the fern prothallis.** Bot. Mag. Tokyo **33**: 157–170. *Tab. I–IV.* 1919.—See Bot. Absts. 4, Entry 1562.

688. Noack, Konrad. [German rev. of: Bally, Walter. **Die Godronschen Bastrade zwischen Aegilops- und Triticumarten. Vererbung und zytologie. (The Godronian hybrids**

between species of Aegilops and Triticum. Heredity and cytology.) Zeitschr. indukt. Abstamm. Vererb. 20: 177–240. *4 fig.* Feb., 1919.] Zeitschr. Bot. 11: 538–541. 1919.

689. Onslow, H. The inheritance of wing colour on Lepidoptera. I. Abraxas grossulariata var. lutea (Cockerell). Jour. Genetics 8: 209–259. *Pl. 9–10, 25 fig.* Sept., 1919.—Orange-yellow ground color of *lutea*, vs. white of type, is "incompletely dominant," or rather, since the mode of the narrowly fluctuating pale yellow of F_1 is nearer the color value of the almost white parent than that of the orange-yellow, "not completely recessive" is more exact. Homozygous orange-yellow likewise gives typical probability-of-error curve. Back-cross of pale heterozygote with homozygous *lutea* shows marked bimodal distribution, grouped about color values of respective parents. F_2 fluctuates more widely than F_1, showing primary mode at color value of pale yellow parents and secondary mode in deep orange-yellow. Mendelian segregation is thus indicated. In back-cross of a rather deeply colored F_1 ♀ × type (white), yellow color of former "does not seem to have any effect." Simple curve, with its one mode at very pale orange-yellow, results from this back-cross. Numerical color values determined by "tintometer," which is described. In reciprocal crosses of *lutea* × *lacticolor*, the usual tendency of femaleness in this species slightly to inhibit development of yellow is exaggerated. "In the deepest colours the yellow pigment is diffused through the chitinous walls of the scales without the formation of any granules."—*J. H. Gerould.*

690. Onslow, H. Inheritance of wing colour in Lepidoptera. II. Melanism in Tephrosia consonaria (var. Nigra Bankes). Jour. Genetics 9: 53–60. *1 pl.* Dec., 1919.—The geometrid *Tephrosia consonaria* var. *nigra*, which is almost uniformly black in the ♀, brownish-black in the ♂, was crossed with the grayish, mottled type, to which it is completely dominant. Extracted recessives differ from the type only in being grayer, less ochreous, than most wild individuals.—*J. H. Gerould.*

691. Pairman, Eleanor, and Karl Pearson. On corrections for the moment coefficients of limited range frequency distributions when there are finite or infinite ordinates and any slopes at the terminals of the range. Biometrika 12: 231–258. Nov., 1919.—This paper gives additional correction formulae for correcting the moments of frequency curves where high contact is not present, in this sense therefore the paper is an extension of the correction formulae of Sheppard.—Correction formulae are presented for all moments up to the seventh for curves where the terminal frequencies are finite quantities as in the case of truncated frequency distributions and where the terminal frequencies are infinite as for J and U curves. Cases illustrative of the use of the formulae on actual frequency data are presented.—*John W. Gowen.*

692. Parker, John H. A preliminary study of the inheritance of rust resistance in oats. Jour. Amer. Soc. Agron. 12: 23–38. 1920.—Pedigree lines of two oat varieties, Burt and Sixty-day, together with a large number of F_2 generation hybrids between these varieties were studied in relation to their rust resistance. The rusts used were the crown rust of oats, *Puccinia lolii avenae* McAlpine and the stem rust of oats, *Puccinia graminis avenae* Erikss. and Henn. Burt and Sixty-day and all the hybrids of these varieties so far tested were found to be entirely susceptible to stem rust. All plants of Sixty-day also were uniformly susceptible to crown rust. Of 223 inoculated plants of Burt, 48 were classified as resistant, 152 as intermediate and 23 as susceptible.—*F. M. Schertz.*

693. Parmenter, Charles L. Chromosome number and pairs in the somatic mitoses of Ambystoma tigrinum. Jour. Morph. 33: 169–249. *9 pl.* Dec. 20, 1919.—Material was obtained from larvae of *Ambystoma* (or *Amblystoma*) *tigrinum.* Mitotic figures in epithelial cells of tail, gill plates and lung, and of the endothelium from peritoneum and mesentery, were studied. Author finds in 66 cells of 23 individuals that the chromosome number is constantly 28. Linear measurements indicate that the chromosomes of a cell form approximately a duplicate series of sizes, and there is considerable resemblance in the form of chromosomes that are members of the same pair. Approximate constancy in size relations between

pairs in complexes of different individuals is noted. In the cells studied, the chromosomes are seldom actually associated in pairs. Results support theory of individuality of chromosomes, and in particular harmonize with the view that in the somatic cells the chromosomes exist in biparental pairs.—*Bertram G. Smith.*

694. Parmenter, Charles L. **The chromosomes of parthenogenetic frogs.** Jour. Gen. Physiol. 2: 205–206. Jan. 20, 1920.—Spermatogonial chromosome groups in frogs developed from artificially parthenogenetic eggs are clearly diploid, probable number 26. Tetrads of normal form are produced in haploid number. Author suggests diploid number of chromosomes is due to retention of second polar body, or to premature division of chromosomes before first cleavage of egg, but work on this point is still in progress.—*A. Franklin Shull.*

695. Payne, F. **Selection for increased and decreased bristle number in the mutant strain 'reduced.'** Anat. Rec. 17: 335–336. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—In the seventh generation of the strain selected for extra bristle number appeared a male with 1 bristle on the scutellum. When out-crossed to wild this reduced condition of the bristle number behaved as a sex-linked character. The number of bristles in this mutant line varied from 0 to 4. Minus and plus selection lines were started and carried for 64 and 60 generations, respectively. Toward the end of the experiment the percentage of zero flies in the minus line varied from 96 to 100. A pure line with no bristles was not produced. In the plus line the percentage of flies with 4 bristles (this is the normal number) reached 64.25 in the fifty-fifth generation. There were very few flies with one and no bristles. The two lines were widely different at the end of the experiment. They came originally from the same pair of parents. How do they differ genetically, is the question. By means of linkage it was shown that there are at least two factors and probably a third concerned in the production of bristles in the plus line. Two of these factors are sex-linked. If there is a third present, it is in the third chromosome. In the minus strain only a single factor is present.—*F. Payne.*

696. Payne, F., and Margaret Denny. **Heredity of orange eye color.** Anat. Rec. 17: 337. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Orange appeared in the mutant strain "reduced." When mated to wild, three kinds of males appeared in F_2. They were red, orange, and a new one called "salmon." From this it seemed that orange was due to two factors, and that they crossed over in F_1. One of these factors by itself produced salmon, the other produced no visible effects. We shall call this second factor "salmon modifier." Experiments were devised to test this hypothesis. If crossing-over occurs between salmon and salmon modifier in F_1, then some of the F_2 red males should carry salmon modifier. These were tested by mating to pure-line salmon females. If crossing-over occurs in F_1 of this cross, salmon and salmon modifier should occasionally get into the same chromosome, and hence orange males should appear in F_2. They do occur, and hence the assumption is justified.—The above outlines the behavior of orange when mated to wild. When mated to reduced, however, no crossing-over occurs in F_1, and hence only orange and red males appear in F_2. Presumably a non-crossover factor is present in the reduced strain which prevents crossing over between salmon and salmon modifier. This has not been sufficiently analyzed to report further.—*F. Payne and Margaret Denny.*

697. Pearl, Raymond, and John Rice Miner. **Variation of Ayrshire cows in the quantity and fat content of their milk.** Jour. Agric. Res. 17: 285–322. *6 fig.* 1919.—A biometrical analysis of variation in quantity per unit of time, and in quality as indicated by fat percentage, of the milk of nearly 7000 Scottish Ayrshire cows for the years 1908 and 1909. In this analysis the milk or butter-fat percentage for each year of age was analyzed separately. —Mean weekly yield of milk with advancing age is found to be represented by a logarithmic function, and to be in accordance with a law which may be stated in this way: The absolute amount of milk produced per unit of time increases with the age of the cow until the maximum is reached, but the rate of increase diminishes with advancing age until the absolute

maximum of production is reached. After the time of maximum productivity, the absolute production per unit of time decreases with advancing age at a continually increasing rate.—Mean fat percentage of the milk was found to decline with advancing age until the tenth year of the cow's life is reached. From this point on, the fat percentage remains about constant through the remainder of the milking life of the cow.—Weighted mean standard deviations and coefficients of variation for mean weekly milk yield was 2.806 gallons and 17.081 per cent, respectively. When all ages were lumped together 3.329 gallons and 20.816 per cent. For fat percentage the weighted mean values for cows of any given age are: Mean = 3.738, standard deviation = 0.330 and coefficient of variation = 8.827.—Relative variability of milk production is compared with other physiological characters; among others the udder as a secreting organ is compared with the oviduct of the hen. It is shown that the oviduct considered as a mechanism operates with somewhat less variability than does the udder, having regard to the absolute weight of the product in the two cases.—Comparisons are made between the relative variability of mean weekly milk yield of these Ayrshires and the daily fluctuations in mixed milk of a large herd. (Such fluctuations are presumably due to environment alone since individual genotype is averaged.) The coefficients of variation stood in the relation of 17.081 to 9.05 respectively. This is held to indicate that about one-half of the observed variation in milk production results from the varying genotypic individuality of the animals with respect to this character and that the other half results from varying environmental influences.—The frequency curves were fitted by the use of Pearson type curves.—Milk-production curves, analytically considered, tend definitely toward positive skewness. This is true in respect to yield and to quality. The weighted mean value of the skewness for mean weekly yield is found to be + 0.1047, and that for fat percentage + 0.1338. These curves for milk yield tend to fall more frequently in unlimited-range types, while those for fat percentage tend more to limited-range types. The estimation of range ends given by the theoretical curves are, on the whole, good.—In general the tendency of milk-yield curve is toward the leptokurtic condition—that is, they are more peaked than the corresponding normal curves would be. Fat percentage curves do not show any definite tendency with respect to kurkosis.—Certain of the milk-yield curves were dissected into two normal curves by Pearson's method. The resulting graduation was not so good as that given by the appropriate unimodal skew frequency curve. There is no evidence that variation curves for milk production are bimodal.—*John W. Gowen.*

698. Pearl, Raymond. **Certain evolutionary aspects of human mortality rates.** Amer. Nat. 54: 5–44. *2 fig.* Jan.–Feb., 1920.—Suggests that studies of vital statistics in man from biological standpoint permit important evolutionary generalizations. Asserts that International-Classification causes of death—180 or more in 14 groups—is biologically unnatural. Presents new classifications for purposes of particular investigation, somewhat changed from International, based on particular group of organs breaking down and causing death, as follows: (1) Circulatory system, blood and blood forming organs. (2) Respiratory system. (3) Primary and secondary sex organs. (4) Kidneys and related excretory organs. (5) Skeletal and muscular systems. (6) Alimentary tract and associated organs concerned in metabolism. (7) Nervous system and sense organs. (8) Skin. (9) Endocrinal system. (10) All other causes of death.—Gives tabular statistical data from U. S. of America, England, Brazil (São Paulo), under each of ten groups in descending-magnitude mortality from three regions, per 100,000. Presents reasons for departure from International method in group classification of many diseases. Tabulates relative importance (breakdown) of organ systems in mortality with discussion. Groups rearranged in descending series on basis of data presented are as follows: (2), (6), (1), (7), (4), (3), (5), (8), (9).—Considers relative mortality on basis of germ layers with interesting result that approximately 57 per cent are endodermal, 30–35 per cent mesodermal, 8–13 per cent ectodermal and assumes inverse correlation with evolutionary degree of differentiation of the germ layers. Emphasizes importance of innate factors as contrasted with environmental factors in influencing mortality.—*L. B. Walton.*

699. Pearson, Karl. **Inheritance of psychical characters.** Biometrika 12: 367–372. *1 pl.* Nov., 1919.—The purpose of this article is to substantiate the claim of the inheritance

of psychical characteristics.—A group of 91 pairs of siblings from the orphan asylums of California has been tested by means of the Stanford Revision of the Binet-Simon method by Dr. Kate Gordon. The reason for selecting siblings from these orphan homes is because the environmental training has been the same for both, thus eliminating that factor of dispute of differential environment. By the table prepared from these results, a mean intelligence quotient (I. Q.) of 92.857 (or 93) ± 0.836 and a correlation of intelligence between the siblings of 0.508 ± 0.0524 are found.—The above results are compared with a table of data computed from the examination of 2801 pairs of siblings from all parts of England and all stations of life, by the "broad-category" method. The unit of this method is called the "mentace." Comparison of the two tables on equal basis was made by evaluating the mentace in terms of the I. Q. unit. A mentace is 1/100 part of the range which limits the category "Intelligent," or 0.1604 I. Q. units.—The results of the second table show a correlation of 0.515 which agrees excellently with the correlation of 0.508 of the first table.—Average genius is 50 I. Q. units above the mean I. Q. of 93 and the average mental defective is 50 I. Q. units below the mean I. Q. Thus also a person with absolute-zero intelligence would be exceedingly difficult to find, for even a low form of idiocy has a slight measurable intelligence. It is quite evident from the comparison of the above data that there is a hereditary factor in the intelligence-resemblance of siblings, and should dispel the prejudiced belief that this resemblance is due to differential environment.—*S. W. Prince.*

700. Pearson, Karl. **On generalized Tchebycheff theorems in the mathematical theory of statistics.** Biometrika 12: 284–296. November, 1919.—Generalizes Tchebycheff's theorem for single variate in form

$$P > 1 - \frac{1}{\lambda^{2s}} \cdot \frac{\mu_{2s}}{\mu_2^s}$$

where P is chance of deviation being smaller than $\lambda\sigma$

For two variates, probability of an observation falling within ellipse χ_0

$$P > 1 - \frac{I_s}{\chi_0^{2s}}$$

where I_s involves high product moments. The theorems are tested empirically and found of little practical value, due both to labor involved and roughness of limits obtained.—*Sylvia Parker.*

701. Pennypacker, John Young. **Observations in the beach plum, a study in plant variation.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 231–269. *Pl. 66–70.* 1919.—The beach plum, which occurs both along the seashore and inland, blossoms on the average about May 2, although certain shore forms do so as late as May 15. The writer indicates the marked variation in size, in mode of branching, in vigor of shoots, in time of appearance, in size and in hairiness of leaves, as well as in their blossoming. The flowers are androdioecious, and this evidently accounts for fruitless plants, others sparsely fruitful and still others full-bearing. The fruit varies greatly in size, color and palatability. Pure yellow fruits were collected, as well as red, purple, and large blue-black drupes. While the purple and blue-black fruits are often rich in tannin, the yellow fruits are comparatively poor in this. The future development of the fruit is considered promising.—*John W. Harshberger.*

702. Pezard, A. **Le conditionnement physiologique des caractères sexuels secondaires chez les oiseaux. Du rôle des glandes génitales.** [The physiological conditioning of the secondary sexual characters in birds. The rôle of the genital glands.] Bull. Biol. France et Belgique 52: *176 p. 1 pl., 79 fig.* 1918.—A careful study of the problem from several angles, which may be reviewed under two heads. (1) Confirmation of previous observations in that the castrated cock retains the male characters except for failure of comb and wattles to develop, and the loss of crowing and sexual instinct. Similar observations were extended

to pheasants. Pullets, when completely castrated, developed male plumage and spurs.—(2) New results. A particular feature is the series of measurements involving body weight, and length of comb and spurs. In the castrated male the growth of the comb is directly proportional to the cube root of the body weight at corresponding ages, but in the intact cock, there is a marked acceleration at puberty in comb growth over the cube root of body weight. The rate of increase in length of spurs in both castrated and intact birds relative to body weight is the same. In males, castrated after complete sexual maturity, there is a loss of crowing and sexual instincts with a regression of comb and wattles, the latter proportional to the length of time following the operation.—Transplantation of testes, or what is more remarkable, the injection of extract of cryptorchid pig testes into castrated males results in the growth of comb and wattles and the reappearance of sexual and crowing instincts.—Pullets containing implanted testes developed large combs and wattles.—Several instances of gynandromorphism are described. The relation between castration, the liver, fat and glycogen formation is discussed, the theorem being developed that the testes elaborate a hormone for the utilization of fat in reproduction.—*H. D. Goodale.*

703. Pierpaoli, I. **Observations on the medlar tree flower and the origin of the stoneless medlar in Italy.** Atti R. Accad. Lincei Rend. Cl. Sci. Fis., Mat. e Nat. 1: 121–125.

704. Pitsch, O. **Erfelykheid en cultuur. Ik ben, ik leef, ik denk. (Heredity and culture. I am, I live, I think.)** Mededeel. R. H. L. T. B. school. Wageningen 13: 105–204. 1918.—A philosophical treatment of the fundamental principles of heredity in their relation to culture, founded upon Descartes' "*cogito, ergo sum,*" and following the lines of Hegel's philosophy. It is wholly impossible and from the viewpoint of the geneticist unnecessary to review the author's exposures.—*M. J. Sirks.*

705. Placzek. **Die Bekämpfung vererbbarer Nervenkrankheiten. [The combating of hereditary nervous diseases.]** Zeitschr. Nerven. 59: 1918.

706. Plahn-Appiani. **Die Individualität von Zucker- und Futterrübe. [Individuality of sugar beets and fodder beets.]** Centralbl. Zuckerind. 1919.

707. Plahn-Appiani. **Das Wurzelgewicht der Beta-Rüben im züchterischen Sinne. [Weight of beet roots in a breeding sense.]** Centralbl. Zuckerind. 1919.

708. Popenoe, Wilson. **Improvement of the avocado by crossing.** California Citrograph 3: 181. June, 1918.—Author briefly characterizes the three "races" of the avocado (*Persea americana*), the West Indian, Guatemalan, and Mexican, noting especially the commercial value of the fruit of the second and the hardiness and early ripening of the third. A supposed cross between the last two races is described, and the possibility that the variety Fuerte resulted from such a cross is mentioned.—*Howard B. Frost.*

709. Proffit, W. J. **Cereal improvement at Svalöf.** Scotland Jour. Agric. 1: 404–414. 1918.—Gives origin and purpose of Swedish Seed Association. Discussion of methods used for cereal improvement.—*H. H. Love.*

710. Przibram, Hans. **Über experimentelle Vererbungsforschung. [Experimental studies on heredity.]** Sitzungsber. anthropol. Ges. Wien 48: 47–51. 1918.—Author discusses briefly a number of results of experimental work in genetics, of interest to anthropologists. The physiology of animal pigmentation is discussed most extensively. An effect of high temperature on the coat color of rats (gray changed to red) is described. Heredity of the modified color was not tested. An increase in relative tail lengths of rats at high temperature was found not to be inherited.—*Sewall Wright.*

711. Rabaud, Etienne. **La panachure du pelage et les phénomènes héréditaires chez la souris. [Variegation of the pelage and the phenomena of heredity in mice.]** Bull. Soc. Zool. France 43: 49–56. 1918.—Mice bred to F_4 from wild gray × albino (neither strain variegated),

showed irregular spotting in certain individuals. Criticism is made of Allen's "centers of pigmentation," Morgan's "incomplete dominance," and Bateson's "disappearance of factors in certain areas." Environment may cause factors *A* (agouti) and *C* (color) to separate in certain cells thus producing white areas.—*P. W. Whiting.*

712. Ragionièri, Attilio. **Improvement of Richardia.** Gard. Chron. **66**: 252–253. *Fig. 116.* Nov. 15, 1919.—*Richardia Rehmannii rosea* was pollinated by *R. Elliottiana.* Differentiating characteristics were: Small, proliferous, *versus* large tubers; narrow, lanceolate, short-petioled, *versus* broad, hastate, long-petioled leaves; few, small, whitish-green, linear markings, *versus* numerous whitish blotches on the leaves; small, short-stalked, nearly closed, *versus* large, long-stalked, well open spathes; and light rosy violet, *versus* yellow spathe-color. The characteristics of *R. Elliottiana* are given last, and are said to be dominant, except for the yellow color which is "almost recessive." Eighteen of the F_1 plants were alike, and had pale cream and rosy violet spathes. The remaining 2 plants were dwarfed and did not flower. In F_2 there were some plants with large well-opened spathes, rosy-violet, purple, orange-yellow, and yellow shaded violet. The leaves varied greatly in size, and in shape from lanceolate to hastate. Some F_2 plants had uniform green leaves without light spots or lines.—The above two species crossed readily with *R. albomaculata*, but could not be crossed with *R. africana.*—*John Belling.*

713. Raunkiaer, C. **Über die verhëltnismässige Anzahl männlicher und weiblicher Individuen bei Rumex thyrsiflorus Fingerh. [On the relative number of male and female individuals in Rumex thyrsiflorus Fingerh.]** Kgl. Danske Videnskabernes Selskab. Biol. Meddel. **1**: 3–17. 1918.—In *Rumex thyrsiflorus* the percentage of female plants is distinctly higher than that of the male plants, the female percentage being between 70 and 95. Differences as to the female percentage are found in different elementary species of *Rumex thyrsiflorus*, some of them being rich in females and some others (relatively) poor. Differences as to the percentage are found from year to year in the same elementary species. The numerical proportion of females to males depends mainly, or entirely, upon the female. The male plants, where differences are found at all, flower earlier than the females. Pollination within the single elementary species seems to weaken the progeny in such way that it flowers later than the progeny from crosses with plants of another elementary species.—*Ø. Winge.*

714. Renner, O. **Ueber Sichtbarwerden der Mendelschen Spaltung im Pollen von Oenotherabastarden. [On the visibility of Mendelian segregation in hybrids of Oenothera.]** Ber. Deutsch. Bot. Gesell. **37**: 129–135. 1919.—*Oenothera Lamarckiana* has distinctly larger pollen grains than *O. muricata.* In each case the frequency curve has a single and pronounced mode. The starch grains of the pollen in the former species are elongated and spindle-form, in contrast to the shorter, plumper grains of the latter. The hybrid *O.* (*Lamarckiana* × *muricata*) *gracilis* has pollen of two types, one like each parent. The frequency curves for size overlap, but the decisive starch-grain difference shows that the two types of microspores occur in equal numbers. The frequency distribution of sizes has two well marked modes, separated from one another by the same interval as that between the modes for the unhybridized parent forms. It is known that the pollen of the hybrid is genetically of two types. The possibility of observing segregation in the microscpores is of the highest possible importance in working out the riddles presented by twin hybrids and other hybridization phenomena in *Oenothera.* —*H. H. Bartlett.*

715. Renner, O. [German rev. of: Atkinson, G. F. **Quadruple hybrids in the F_1 generation from Oenothera nutans and Oe. pycnocarpa, with the F_2 generations, and back crosses and intercrosses.** Genetics **2**: 213–260. *16 fig.* 1917.] Zeitschr. indukt. Abstamm. Vererb. **21**: 186–187. Sept., 1919.

716. Renner, O. [German rev. of: Heribert-Nilsson, Nils. **Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung Salix.** (Experimental

studies on variability, segregation, speciation and evolution in the genus Salix.) Lunds Univ. Arsskrift N. F. Afd. 2. 14: (No. 28): 1-145. *65 fig.* 1918.] Biol. Zentralbl. 39: 479-480. Oct., 1919.

717. Renner, O. [German rev. of: Lotsy, J. P. De Oenotheren als kernchimeren. (The Oenotheras as nuclear chimeras.) Genetica 1: 7-69. 1919.] Zeitschr. indukt. Abstamm. Vererb. 21: 183-184. Sept., 1919.

718. Renner, O. [German rev. of: Raunkiaer, C. Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. (On the concept of elementary species in the light of modern genetical investigations.) Zeitschr. indukt. Abstamm. Vererb. 19: 225-240. *2 fig.* 1918.] Zeitschr. Bot. 11: 474-475. 1919.

719. Renner, O. [German rev. of: Tischler, G. Analytische und experimentelle Studien zum Heterostylie-problem bei Primula. (Analytical experimental studies on the problem of heteroztyly in Primula.) Festschr. z. Feier des 100-Jährigen Bestehens der Kgl. Württ. Landwirtsch. Hochschule Hohenheim. p. 254-273. *4 fig.* April, 1918. *Ibid.* Das Heterostylie-Problem. (The problem of heterostyly.) Biol. Zentralbl. 38: 461-479. Nov., 1918. (See Bot. Absts. 4, Entries 789, 790.)] Zeitschr. Bot. 11: 475-476. 1919.

720. Ritter, William Emerson. The unity of the organism. 2 vol. *14 × 20 cm., ix + 398, ix + 408 p., 61 fig.* Richard G. Badger: Boston, 1919.—This work is devoted to elaboration of "organismal," as opposed to "elementalistic" point of view. Author's main thesis is that organism as a whole is the unit, and is not explained merely by combined action of parts into which it can be analyzed. Whole no more to be causally explained by interaction of parts than parts by whole. In relation to genetics, author holds that the mechanism of heredity is as much a part of and subordinate to the organism as are all of its other parts and organs. Chromosomes, even though they may be bearers of heredity, are causally explained by organism in same sense that heredity attributes of organism are causally explained by chromosomes. Author recognizes that not many of major theories in biology are more securely established than that hereditary attributes in bisexually propagating organisms are in some way and to some extent dependent upon chromosomes of germ-cells. He even recognizes possibility (though regarding this as far from proved) that chromatin of sperm nucleus may "carry" all the hereditary potentialities derived from male parent. But this does not cover case of protozoa, for which he offers evidence that heredity is not wholly conditioned by nucleus; nor does it cover asexually reproducing plants and animals, which are too largely overlooked by geneticists. Here cytoplasmic characters are seen to be carried over directly, and the claim that cell nuclei are, despite appearances, the really effective and responsible agents is not in accordance with legitimate scientific procedure. Hence cytoplasm, no less than chromatin, is entitled to be regarded as "hereditary substance." Another reason for so regarding it is that *in all cases* the working out of the hereditary process in ontogeny (be it initiated by chromosomes or not) is dependent upon processes occurring in cytoplasm. Latter, therefore, is an integral part of the hereditary mechanism.—In discharge of this function, cytoplasm must have antedated chromatin. Heredity is coextensive with organic propagation and development, while "carrying heredity" by chromosomes is very far from a universal phenomenon.—Author protests against restricting studies of heredity so largely to adult characters. Present evidence comes from observations on germ-cell stages at one end and on adult stages at other end of ontogenetic series. He urges importance of recognizing heredity as working by transformation rather than transmission, and insists upon importance of detailed embryological studies of origin and growth of hereditary characters. Some illustrative cases of this mode of procedure are cited.—Author takes issue with contention that organism does not truly produce its own germ cells and contends that the hereditary substance becomes such, in some way, through being subject to metabolic processes common to whole organism. He does not, however, lay much stress on "inheritance of acquired characters," though not denying its possibility.—*F. B. Sumner.*

721. Riviere, G., and G. Bailhache. **L'Amygdalopersica Formonti.** Compt. Rend. Acad. Sci. Paris 168: 525. 1919.—This graft hybrid produced a fertile seed from which was grown a shrub, now three years old, which exhibits solely the characteristics of an almond particularly in regard to its leaves. Three more fertile seeds were produced in 1917 on the spontaneously arisen almond branches. These have also produced young vigorous almond trees.—*E. B. Babcock.*

722. Roberts, Herbert F. **A Darwinian statement of the Mendelian theory.** Nature 103: 463–464. Aug. 14, 1919.—Extracts from "Animals and plants under domestication;" explanation of reversion in F_2 through recombination of dormant grandparental gemmules.—*Merle C. Coulter.*

723. Roberts, Herbert F. **A demonstration of the coefficient of correlation, for elementary students of plant breeding.** School Sci. and Math. 19: 619–628. *6 fig.* 1919.—A demonstration of the meaning of the correlation coefficient. A geometric and trigonometric explanation is given. "The value of the correlation coefficient is always the value of the tangent of the angle which the correlation line forms with the axis of X, where it passes through the point of intersection of the axes X and Y." The numerical relation between the tangent and correlation coefficient is shown. The illustrations and discussions will bring out more forcibly the meaning of the correlation coefficient.—*H. H. Love.*

724. Roberts, Herbert F. **An improved colorimeter for color inheritance study.** Plant World 22: 262–269. *4 fig.* Sept., 1919.—Author describes (using construction diagrams) improvement on a common tintometer, to make it more readily available to geneticists. Most important change is addition of mechanism for revolving colored material to eliminate effects of inequalities of surface. Recommends use of artificial light and ascertaining by voltmeter that current for it is constant.—*James P. Kelly.*

725. Rosendahl, C. O. **Variations in the flowers of Erythronium propullans Gray.** Torreya 19: 43–47. *3 fig.* Mar., 1919.—Stamens 2 to 6, mode 4; perianth segments 4 to 6; mode 4; taxonomic relatives fairly constant 6 in both cases. [See Bot. Absts. 3, Entry 340.]—*Merle C. Coulter.*

726. Russell. Alice Mary. **The macroscopic and microscopic structure of some hybrid Sarracenias compared with that of their parents.** Contrib. Univ. Pennsylvania Bot. Lab. 5: 3–41. *Pl. 1–5.* 1919.—The writer finds that the hybrid forms of *Sarracenia* studied in comparison with their parents are intermediate in relation in almost all details. This is shown in the size of the plants, in the shape of the pitchers, in the blending of the placental lid shapes, in the matter of coloring, in the matter of the size and shape of the flowers (especially petal shape and size), in the odor, etc. All of the above examples of the blending of parental characters can be seen with the naked eye. The microscopic details show also the intermediate condition of the hybrids in the epidermal cells of the outer pitcher surfaces, in the epidermal cells of the conducting surface, in the number of stomata, in the unicellular hairs and hairs on the detentive and inner lid surfaces, in the microscopic structure of the pitcher rim, in the thickness of the leaves, and in other details. Other peculiarities are noted under the caption bisexual hybridity.—*John W. Harshberger.*

727. Rutgers, A. A. L. **Selectie en uitdunning. [Selection and thinning.]** Arch. Rubbercult. Nederlandsch-Indië 3: 105–118. 1919.—See Bot. Absts. 3, Entry 2051.

728. Sand, Knud. **Experiments on the internal secretion of the sexual glands, especially on experimental hermaphroditism.** Jour. Physiol. 53: 257–263. Dec. 3, 1919.—Abstract of a monograph by the author, the Danish title as given in the references being, "Experim. Studier over Kons-Karakterer hos Pattedyr. Copenhagen, 1918."—Author has repeated and confirmed Steinach's experiments on guinea-pigs and rats. Castrated males with implanted ovaries became feminized, and castrated females with implanted testes became masculin-

ized. Artificial hermaphrodites were produced, which exhibited development of both sets of characters (penis and mammae). The psychical condition exhibited varied according to the animals with which the hermaphrodite was in contact. Using a new method, i.e., placing ovaries inside the testes, artificial ovo-testes were produced thus showing that no antagonism exists between the two sorts of sexual organs.—*H. D. Goodale.*

729. Saunders, A. P. **The preservation of pollen for hybridizing.** Bull. Peony News 6: 2–9. 1918.—Review of experimental results on longevity of pollen. Tomato pollen is often kept from late summer flowers for use on green-house plants following winter. Grape pollen is viable for two months; date palm, a year or more; carnation pollen in close stoppered bottles is viable for several weeks; *Cheiranthus cheiri*, 14 days (Kölreuter). Mentions Gärtner's elaborate experiments on longevity of viability in pollen. Pfundt's methods of testing pollen viability are much shorter, less work, and probably give just as accurate results as the longer, more laborious method of earlier workers, such as Gärtner. Pollen of many species germinates in 15 to 20 per cent concentration of cane sugar in water. Hanging drop culture of pollen in this solution germinates in a few hours if viable. Pollen-tube formation is much slower in old pollen than in fresh pollen. Pfundt found in numerous experiments, longevity of viability of pollen was greatly influenced by humidity—wet weather decreasing, and dry weather increasing the longevity of viability. Pure concentrated sulphuric acid in a desiccating vessel gives very near zero humidity. 54 per cent acid + 46 per cent water gives about 30 per cent humidity (roughly dry-weather conditions). 37 per cent acid + 63 per cent water gives 60 per cent humidity (roughly moist weather). 15 per cent acid + 85 per cent water give 90 per cent humidity (muggy, rainy weather conditions).—Pfundt kept pollen samples in dark at room temperature (ordinarily 65°F.) in desiccating vessels containing various per cents of sulphuric acid and water mixture. Longevity of viability of pollen of various species belonging to 6 very distinct orders tested by the above methods is tabulated. Pollen of *Prunus avium* in ordinary air of room remained viable 28 days; in 90 per cent humidity, 12 days; in 60 per cent, 25 days; in 30 per cent, 102 days; in zero humidity, 126 days. Pollen of grasses (*Zea, Poa*) thus tested remained viable only one day under any of these conditions. Genera tested were *Colchicum, Hemerocallis, Tulipa, Galanthus, Iris, Peonia, Trollius, Zea, Poa, Prunus, Lupinus, Viola, Primula.*—Wetting pollen, even for a short time, often markedly decreases length of viability. Pollen of garden nasturtium (*Tropaeolum*) wetted two minutes then artificially dried, remained viable only 2 days against 88 days for unwetted sample. Pollen tubes in most plants are not formed at low temperatures, but in such flowers as *Crocus*, Snowdrop (*Galanthus*) and Christmas Rose (*Helleborus*), pollen forms tubes at 40°F. Cane-sugar solutions should be sterilized by heating, as pollen is very susceptible to mould. When perfectly fresh, only about 20 to 30 per cent of pollen is viable. Light frosts are not fatal to pollen vitality. Subjected to 29–30°F. for several hours, pollen still retains much of its original viability. Peony pollen long-lived, making crosses between early and late varieties possible and shipment practicable. Directions are given for crossing peonies.—*O. E. White.*

730. Schadelin, W. **Wirtschaftliche Zuchtwahl. [Practical selection.]** Schweiz. Zeitschr. Forstwesen 70: 101–103. 1919.

731. Scheurer, P. **Zum Problem der Geschlechtsvorhersage. [Contribution to the problem of sex-prediction.]** Correspl.-Blatt Schweizer Ärzte 48: 1473–1483. No date.

732. Schleip, W. [German rev. of: Kammerer, Paul. **Vererbung erzwungener Formveränderungen. I. Die Brunftschwiele des Alytes-Männchen aus "Wassereiern." (Inheritance of induced changes of form. I. The callosities of the Alytes males from "water-eggs.")** Arch. Entwicklungsmech. Org. 45: 323–370. *Pl. 10–11.* 1919. (See Bot. Absts. 4, Entry 757.)] Zeitschr. indukt. Abstamm. Vererb. 21: 174–179. Sept., 1919.

733. Schouten, S. L. **Väriabiliteit by schimmels. (Variability in Eumycetes.]** Handel. 16e Nederl. Natuur-en Geneeskundig Congres's Gravenhage 16: 270–272. 1918.—Cases of "mutation" found by the writer in his cultures of various Eumycetes, may be grouped in this way:

A. In the original culture one or more abnormal growing portions become macroscopically visible. These abnormally growing parts of the mycelium may be isolated and cultivated in new cultures ("downform" of *Favus*, further in *Penicillium, Cephalothecium roseum, Torula, Cladosporium herbarum*).

B. In the original culture some abnormal cells develop, that may be isolated and cultivated; these cases belong to two different groups:

a. In this new culture the fungus remains sometime in a period of difficulties in growing, resulting in a dwarf form: *Rhizopus oryzae* a.o.

b. The cell is not feeble, but is abnormal in form, constitution, cellwall etc., a well-growing new culture arises: *Dematium pullulans, Phycomyces nitens.*

A remarkable case is described by the writer in *Aspergillus Wentii*; the species has two forms of conidiophores, one of 2 to 3 mm. the other 10 mm. in length. The cultures, resulting from these different conidia, are different in very remarkable features; a culture from both forms of conidia mixed gives the normal culture of the fungus.—*M. J. Sirks.*

734. Schouten, S. L. [Dutch rev. of: Hagedoorn, A. L., and A. C. Hagedoorn-Vorstheuvel la Brand. **Het overgeërfde moment bij bacterieele ziekten. (The inherited factor in bacterial infection.)** Nederl. Tijdschr. voor Geneesk. 63: 179–182. 1919.] Genetica 2: 61–62. Jan., 1920.

735. Schouten, S. L. [Dutch rev. of: Schermers, D. **Erfelijkheid en rasverbetering. (Heredity and race-improvement.)** Schild en Pijl. 1919.] Genetica 2: 81–82. Jan., 1920.

736. Schouten, S. L. [Dutch rev. of: Tammes, T. **De leer der erffactoren en hare toepassing op den mensch. Rede, uitgesproken bij het aanvaarden van het ambt van buitengewoon hoogleeraar aan de Rijks-Univ. te Groningen. (The theory of hereditary factors and its applicability to man. Address, delivered on assumption of the office of Professor Extraordinarius in the State University at Groningen.)** Wolters: Groningen, 1919.] Genetica 2: 84–85. Jan., 1920.

737. Schribaux. [Rev. of: Aumiot, J. **Les mutations gemmaires culturales des Solanum tubérifères sauvages. (Bud mutations of the wild tuber-bearing Solanum.)**] Compt. Rend. Acad. Agric. France 5: 289–293. 1919.

738. Seyster, E. W. **Eye facet number as influenced by temperature in the bar-eyed mutant of Drosophila melanogaster (ampelophila).** Biol. Bull. 37: 168–182. *1 pl.* Sept., 1919.—This analysis of the effect of temperature on facet number in the bar-eyed mutant race of *Drosophila melanogaster* indicates that facet number bears an inverse relationship to temperature,—low temperatures resulting in high facet number and *vice versa.* It also indicates that the critical period precedes the pupal stage,—changes in temperature subsequent to pupation have no effect. Flies were reared at temperatures ranging from 15° to 30°C.; facet number changed on average of 5.2 to 8.9 per degree of temperature change. It is suggested that causal agent is a chemical acting as an inhibitor of facet formation and varying its speed of action with changes in temperature according to van't Hoff's law. With each 10° drop in temperature between 29° and 15° facet number increased on average 2.6 times in males and 3.5 times in females. Light and amount of food apparently have little or no effect on facet number.—*Chas. W. Metz.*

739. Shamel, A. D. **A performance-record Lisbon lemon orchard.** California Citrograph 3: 75, 78. *1 table, 2 fig.* Feb., 1918.—Author describes a remarkably uniform and productive lemon orchard, which was planted entirely with trees budded from a single superior parent tree.—*Howard B. Frost.*

740. Shamel, A. D. **Better California grapefruit.** California Citrograph 3: 94, 115, 116. *4 fig.* Mar., 1918.—Author discusses variant types of the Marsh variety; attributes recent improvement in market for California grapefruit to better maturity, better packing, and extensive elimination from orchards of the trees of undesirable types.—*Howard B. Frost.*

741. Shaw, J. K., and J. B. Norton. The inheritance of seed-color coat in garden beans. Massachusetts Agric. Exp. Sta. Bull. 185: 58-101. 1918.—A record of the inheritance of seed coat color as indicated by crosses involving twenty-one different varieties of garden beans. The inheritance of pigments and of pigment patterns were investigated. No relationship was found to exist between the behavior of these two characters, each being controlled by distinct factors. The genetic composition of the different varieties with respect to both pigments and pigment pattern is listed according to the factorial hypothesis advanced by the authors to account for the observed results.—*G. P. McRostie.*

742. Shull, G. H. Sterility and self and cross incompatibility in shepherd's purse. Science 49: 547. 1919.—Portion of author's abstract of paper read before the American Philosophical Society, April 25, 1919. Sexual reproduction is complex succession of processes, which may be broken at any one of a number of different points. Sterility may therefore result in different ways that can not be brought under a common viewpoint. Many biotypes of *Bursa bursa-pastoris* display unique characteristics with respect to sterility and fertility. Most biotypes from Europe and North Eastern America have the lower flowers of the central axis nearly always completely sterile. A form common on the Pacific coast of North and South America and extending at least as far eastward as Tucson, Arizona, has no sterile flowers at base of raceme. Cross between an east American biotype and the Pacific coast form gave an F_1 partially sterile, with a rhythmic succession of fertile and sterile flowers. In F_2 about one in sixteen resembled one P_1, and a like number resembled the other P_1, while 14 again showed a rhythmic succession, thus suggesting the interplay of two genetic factors.—*Geo. H. Shull.*

743. Siemens. [Rev. of: Classen, K. Vererbung von Krankheiten und Krankheitsanlagen durch mehrere generationen. [Inheritance of diseases and disease primordia through several generations.] Arch. Rassen.- u. Gesellschaftsbiol. 13: 31-36. 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 122-123. July, 1919.

744. Siemens. [German rev. of: Klausner, Priv.-Doz. Dr. E. Über angeborene bezw. hereditäre Zystenbildung im Bereiche der Talgdrüsen. (On congenital or hereditary formation of cysts from the sebaceous follicles.) Dermatolog. Wochenschr. 65: 711. 1917.] Zeitschr. indukt. Abstamm. Vererb. 22: 144. Jan., 1920.

745. Siemens. [Rev. of: Lenz, Dr. Fritz. Über dominantgeschlechtsbegrenzte Vererbung und die Erblichkeit der Basedowdiathese. (On dominant sex-linked heredity and the inheritance of Basedow's disease.) Arch. Rassen.- u. Gesellschaftsbiol. 13: 1-9. 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 123-124. July, 1919.

746. Siemens. [Rev. of: Paulson, Dr. Jens. Über die Erblichkeit von Thoraxanomalien mit besonderer Berücksichtigung der Tuberkulose. (On the inheritance of anomalies of the thorax with special reference to tuberculosis.) Arch. Rassen.- u. Gesellschaftsbiol. 13: 10-31. 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 122. July, 1919.

747. Siemens. [Rev. of: Stieve, Dr. H. Über Hyperphalangie des Daumens. (On hyperphalangy of the thumb.) Anat. Anzeiger 48: 64. Dec., 1919.] Zeitschr. indukt. Abstamm. Vererb. 22: 64. Dec., 1919.

748. Siemens. [Rev. of: Wolff, Dr. Friedrich. Ein Fall dominanter Vererbung von Syndaktylie. (A case of dominant inheritance of syndactyly.) Arch. Rassen.-u. Gesellschaftsbiol. 13: 74-75. 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 122. July, 1919.

749. Silver, Allen. Finch hybrids. Avic. Mag. 10: 98. Mar., 1919.—Author is investigating reported hybrids between Twite and Redpoll, Goldfinch and Twite, and Chaffinch and Canary. Reports a Twite-Goldfinch hybrid with observations on F_1 characters.—*E. B. Babcock.*

750. Simons, A. **Familiäre Trommelschlegelbildung und Knochenhypertrophie. [Familial formation of drumstick fingers and hypertrophy of the joints.]** Deutsch. Zeitschr. Nervenheilk. 59: 1918.

751. Sirks, M. J. **De erfelykheidsbeschouwingen van Carl von Naegeli. (1817–1891.) [Carl von Naegeli's (1817–1891) conceptions of heredity.]** De Tydspiegel. 75: 265–283. 1918.—The greater part of modern botanists and geneticists know Naegeli's conceptions of heredity only from his most important work: Mechanisch-physiologische Theorie der Abstammungslehre. But the philosophical manner of treatment in this work, denied by Naegeli himself as being a well-founded way, is notwithstanding a hindrance for right appreciation of his attitude towards the problems of evolution; his earlier papers (published in Sitzungsberichte kön. Akad. d. Wissensch. München, 1865, 1866, 1872, 1874 and Entstehung und Begriff der Naturhistorischen Art. München. 1865) give us a widely different opinion about his conceptions. Naegeli in these years was a sharp anti-Lamarckian; though being a florist, he could not agree with the general florists' opinion of the origin of new species and varieties by acclimatization. A fundamental difference between species and varieties does not exist in his opinion; their origin is of the same character. He makes in these previous papers a beginning with development of his "idioplasma"-theory; it is still in embryonal form and its further building has not yet begun. That is a great profit of these papers; the mystical "Vervollkommnungstrieb" of his later conceptions has not yet been born. Instead of this he seeks a rich source of new varieties in hybridization; he knows the variability of F_2 generations though, perhaps as a result from the misleading hybridization-experiments in Hieracium, he did not think this hybridization was a factor in the evolutionary process. His original papers before 1875 contain much more sane and critical remarks than did his greater work of 1884. —*M. J. Sirks.*

752. Sirks, M. J. [Dutch rev. of: Dürken, Bernhard. **Einführung in die Experimentalzoologie. (Introduction to experimental zoology.)** *x + 446 p., 224 fig.* Julius Springer: Berlin, 1919.] Genetica 2: 55–58. Jan., 1920.

753. Sirks, M. J. [Rev. of Honing, J. A. **Een steriele dwergform van Deli-tabak, onstaan als bastaard. (A sterile dwarf form of Deli tobacco originated as a hybrid.)** Bull. Deliproef. Medan. Sumatra 10: *24 p., 3 pl.,* 1917.] Zeitschr. indukt. Abstamm. Vererb. 22: 60. Dec., 1919.

754. Sirks, M. J. [Dutch rev. of: Houwink, R. Hzn. **Erfelijkheid. Populaire beschouwingen omtrent het tegenwoordige standpunt der erfelijheid, verzameld uit theorie en practijk. (Heredity. Popular presentation of the present status of heredity compiled from theory and practice.)** Assen. Stoomdrukkerrij Floralia 1919: 1–62. *5 pl.,* 1919.] Genetica 2: 63. Jan., 1920.

755. Sirks, M. J. [Dutch rev. of: Kajanus, B. **Genetische Studien über die Blüten von Papaver somniferum L. (Genetical studies on the flowers of Papaver somniferum L.)** Ark. Bot. K. Svensk. Vetenskapsakad. 15: 1–87. *3 pl.* 1919.] Genetica 2: 64–65. Jan., 1920. —See Bot. Absts. 3, Entry 2147.

756. Sirks, M. J. [Rev. of: Kajanus, B. **Elementär ärftlighet lära. [Elementary genetics.)** *88 p.* P. A. Norstedt and Söner: Stockholm, 1917.] Genetica 1: 555. Nov., 1919.

757. Sirks, M. J. [Dutch rev. of: Kammerer, P. **Vererbung erzwungener Formveränderungen. 1. Die Brunftschwiele des Alytes-Männchen aus "Wassereiern." (Inheritance of induced changes of form. 1. The callosities of the Alytes males from "water-eggs.")** Arch. Entwicklungsmech. Org. 45: 323–370. *Pl. 10–11.* 1919.—MacBride, E. W. **The inheritance of acquired characters.** Nature 103: 225. May 22, 1919.—Bateson, W. **Dr. Kammerer's testimony to the inheritance of acquired characters.** Nature 103: 344–345. July 3, 1919.] Genetica 2: 65–67. Jan., 1920.—See Bot. Absts. 4, Entry 732.

758. Sirks, M. J. [Dutch rev. of: MacLeod, J. The quantitative method in biology. *15 × 23 cm., v + 228 p., 27 fig.* Longmans, Green & Co.: New York. 1919.] Genetica 2: 69–71. Jan., 1920.

759. Sirks, M. J. [Rev. of: Mayer-Gmelin, H. Mededeelingen omtrent enkele kruisings en veredelingsproefnemingen. (Reports on several experiments in crossing and selection.) Cultura 30: 1–19. *4 pl.* 1918. (See also Bot. Absts. 4, Entry 675.)] Zeitschr. indukt. Abstamm. Vererb. 22: 60–61. Dec., 1919.

760. Sirks, M. J. [Rev. of: Reiners, J. H. Th. De studie der afstammingen der bloedlynen en de karakteristiek van onze rundveerassen. (The study of descendance and bloodlines and the characteristics of our races of cattle.) Cultura 30: 328–353. 1918.] Zeitschr. indukt. Abstamm. Vererb. 22: 63. Dec., 1919.

761. Sirks, M. J. [Dutch rev. of: Schmidt, Johannes. Der Zeugungswert des Individuums beurteilt nach dem verfahren kreuzweiser Paarung. (Individual potency based on experience in crossmatings.) *8vo., 40 p.* Gustav Fischer: Jena, Germany, 1919. (See Bot. Absts. 3, Entry 2190.)] Genetica 2: 82–83. Dec., 1919.

762. Sirks, M. J. [Rev. of: Tammes, T. De veredeling van het vlas in Nederland. (Flax breeding in Holland.) Mededeel. Ver. Wetenschapp. 9: *19 p.* 1918. (See Bot. Absts. 3, Entry 1519.)] Zeitschr. indukt. Abstamm. Vererb. 22: 61–62. Dec., 1919.

763. Sirks, M. J. [Dutch rev. of: Thomson, J. A. Heredity. *3rd ed., 627 p., 47 fig.* J. Murray: London, 1919.] Genetica 2: 85–87. Jan., 1920.

764. Sirks, M. J. [Rev. of: Tjebbes, K., and H. N. Kooiman. Erfelykheidsonderzoekingen by boonen. (Genetical experiments with beans.) Genetica 1: 323–346. 1919.] (See also Bot. Absts. 3, Entry 1041.) Zeitschr. indukt. Abstamm. Vererb. 22: 63–64. Dec., 1919.

765. Sirks, M. J. [Rev. of: van Herwerden, M. A. De terugkeer van een sedert zeven jaar verdwenen kenmerk in een cultuur van Daphnia pulex. (The return of a characteristic which had disappeared for seven years in a culture of Daphnia pulex.) Genetica 1: 321–322. 1919. (See also Bot. Absts. 3, Entry 1043.)] Zeitschr. indukt. Abstamm. Vererb. 22: 62–63. Dec., 1919.

766. Sirks, M. J. [Dutch rev. of: van der Wolk, P. C. Onderzoekingen over blyvende modificaties en hun betrekking tot mutaties. (Researches on permanent modifications and their relations to mutations.) Cultura 31: 82–105. *1 p.* 1919. (See Bot. Absts. 3, Entry 296; 4, Entry 767.)] Genetica 2: 94–96. Jan., 1920.

767. Sirks, M. J. [Rev. of: Van der Wolk, P. C. Onderzoekingen over blyvende modificaties en hun betrekking tot mutaties. (Experiments on persistent modifications and their relations to mutation.) Cultura 31: 82–105. 1919. (See Bot. Absts. 3, Entry 296; 4, Entry 766.)] Zeitschr. indukt. Abstamm. Vererb. 22: 58–60. Dec., 1919.

768. Sirks, M. J. [Dutch rev. of: Winge, Ø. On the non-Mendelian inheritance in variegated plants. Compt. Rend. Trav. Lab. Carlsberg 14: 1–20. *4 fig.* 1919. (See Bot. Absts. 3, Entry 306.)] Genetica 2: 91–92. Jan., 1920.

769. Sirks, M. J. [Dutch rev. of: Winge, Ø. On the relation between number of chromosomes and number of types, in Lathyrus especially. Jour. Genetics 8: 133–138. *Pl. 5.* Apr., 1919. (See Bot. Absts. 3, Entry 307.)] Genetica 2: 92–93. Jan., 1920.

770. Slocum, R. R. Breeding poultry for standard and utility values. Reliable Poultry Jour. 26: 57, 103, 104. *4 fig.* 1919.—Author states that there has been a tendency among poultry breeders to split into two factions,—the fancy and the utility breeders. The reasons for

this are briefly discussed. Author takes stand that standard and utility requirements are not opposed, but that they may easily be combined and that breeders should give the matter more careful attention. As an example of what can be done in this direction author cites instances observed at the Government Poultry Farm at Beltsville, Md.—*Philip B. Hadley.*

771. SMITH, BETRAM G. **The individuality of the germ-nuclei during the cleavage of the egg of Cryptobranchus allegheniensis.** Biol. Bull. 37: 246–286. *9 pl.* Oct., 1919.—In the fertilization of the egg of *Cryptobranchus allegheniensis* the germ nuclei do not fuse and in the first division of the egg the chromosome groups are separate. Individuality of germ nuclei has been traced to an advanced cleavage stage.—*Karl Sax.*

772. STAKMAN, E. C., H. K. HAYES, O. S. AAMODT, AND J. G. LEACH. **Controlling flax wilt by seed selection.** Jour. Amer. Soc. Agron. 2: 291–298. *Pl. 9.* 1919.—The authors believe that the decreased production of flax and the gradual movement of the center of production to new lands is caused chiefly by the ravages of the flax wilt (*Fusarium lini* Bolley). Selection of wilt-resistant varieties is offered as a solution of the flax-wilt problem. Such selection work has been carried on in Minnesota since 1911. Varieties have been obtained which show marked resistance to this disease. Plants were grown on infested ground and as a rule bulk selection of seed from resistant plants was followed. This seed was planted again on infested soil and additional selections made. Only one strain of the wilt-producing organism has appeared and selections resistant at St. Paul, Minnesota, have also proved resistant at Watseca, Minnesota. A seed-plot method is recommended for the flax producer by which seed for the general crop is selected each year from plants grown the previous year on a small plot of land badly infested with the wilt-producing organism.—*G. P. McRostie.*

773. STECHE, O. **Grundriss der Zoologie. [Foundation of zoology.]** *508 p.* Veit u. Co.: Leipzig. 1919.

774. STEIN, E. [German rev. of: NUTTALL, J. S. W. **A note on the inheritance of colour in one breed of pigeons—an attempt to demonstrate a Mendelian type of transmission.** Jour. Genetics 7: 119–124. 1918. (See Bot. Absts. 1, Entry 234.)] Zeitschr. indukt. Abstamm. Vererb. 21: 179. Sept., 1919.

775. STEIN, E. [German rev. of: PUNNETT, R. C., AND P. G. BAILEY. **Genetic studies in poultry. I. Inheritance of leg-feathering.** Jour. Genetics 7: 203–213. 1918. (See Bot. Absts. 1, Entry 492.)] Zeitschr. indukt. Abstamm. Vererb. 21: 179. Sept., 1919.

776. STEIN, E. [German rev. of: JONES, W. N., AND M. C. RAYNER. **Mendelian inheritance in varietal crosses of Bryonia dioica.** Jour. Genetics 5: 203–222. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 189. Sept., 1919.

777. STIEVE, DR. H. **Über Hyperphalangie des Daumens. [On hyperphalangy of the thumb.]** Anat. Anzeiger 48: 64. Dec., 1919.—See Bot. Absts. 4, Entry 747.

778. STOMPS, THEO. J. **Gigas-mutation mit und ohne Verdoppelung der Chromosomenzahl. [Gigas mutation with and without doubling of the chromosome number.]** Zeitschr. indukt. Abstamm. Vererb. 21: 65–90. *3 pl., 4 fig.* July, 1919.—Studies on chromosome numbers of *semi-gigas* and *gigas* mutations in *Narcissus*. *N. poeticus* L., *N. poeticus poetarum* and *N. poeticus ornatus*, diploid number 16, present difficulties in counting. One pair of "companion" chromosomes ("Trabanten") are attached to a longer pair at metaphase. Apparent count is thus 14, true count, 16. *N. poeticus poetarum* mut. "Glory of Lisse" and "Albion," *semi-gigas* and *gigas* forms, respectively, as shown by comparison of their characters with analogous forms of *Oenothera* (two tables of cell measurements and photographs of plants, pollen and epidermis are given), have the *normal diploid* number of chromosomes. *N. biflorus* Curt. found growing wild near *N. poeticus* is triploid and is a natural hybrid between a tetraploid *N. poeticus* mut. *gigas* and *N. tazetta*.—Theory is developed that since, in *Narcissus*, *Primula sinensis* (Gregory) and *Oe. Lamarckiana* mut. *gigas*, individuals are

known some with and some without doubling of chromosome number, such doubling is not the cause of the mutation but a character of the mutant. Chromosome number may also be a character of an intermediate triploid species. Within a species, variation in number is analogous to the occasional production of, e.g., 4 leaves in a trifoliate species.—Tetraploid "mut. *gigas*" graft hybrid of *Solanum nigrum* and *S. lycopersicum* (H. Winkler) is discussed at length. Suggests that term *gigas* be reserved for sexually produced mutations. Low fertility, etc., of asexually produced tetraploid forms forbid their designation as true *gigas* mutations. Thorough investigation of the results of Miehe on nuclear migration and of Winkler's graft hybrid brings the author to the conclusion that (1) cell and nuclear fusion do not occur in the graft callus, (2) adventitious buds do not originate in syndiploid cells and (3) doubling of the chromosome number is accidental.—Plate 1 shows the divergent types of chromosomes in the hitherto uninvestigated *Narcissus* root tips of the several species.—*Paul A. Warren.*

779. Stout, A. B., and Helene M. Boas. **Statistical studies of flower number per head in Cichorium intybus: kinds of variability, heredity, and effects of selection.** Mem. Torrey Bot. Club **17**: 334–458. June 10, 1918.—Extended review of literature pertaining to number of flowers per head in Compositae. Statistical analysis of data on flower number in a large number of plants of perennial (and a race of annual) *Cichorium intybus* collected during four successive years throughout each entire season of bloom. Intraseasonal change in flower number (usually decrease from beginning to end of season) is influenced by length of blooming period, age of plant, and position of flower head on plant. Individual variability is considerable but races were isolated which, through four generations grown, showed characteristic differences in flower number and vegetative characters.—*Helene Boas Yampolsky.*

780. Swynnerton, C. F. M. **Experiments and observations bearing on the explanation of form and colouring.** 1908–1913. Jour. Linnean Soc. **33**: 203–285. June 30, 1919.—Outlines general methods employed in connection with some 1600 experiments (taking into consideration those completed and in progress), at Chirinda, Africa, relative to selection and animal coloration on the basis of food preferences. Birds, with a few other animals (monkey, lizard, chameleon, a solpugid, and some insects) were utilized as subjects, their preferences for food, principally insects (particularly butterflies) being carefully noted.—Reports 228 detailed experiments with three captive birds, "European Rollers" (*Coracias garrulus* Linn.) (Picariae), "A," "B," and "C," and tabulates preferred groups of insects (mostly) from highest grade (1) or most acceptable food, to lowest grade (32) or least acceptable food.—General conclusions are postponed until experiments in progress are finished.—The studies constitute evidence of decided value relative to mimicry and other problems of selection.—*L. B. Walton.*

781. Tammes, Tine. [Rev. of: Bridges, Calvin B. **Nondisjunction as proof of the chromosome theory of heredity.** Genetics 1: 1–52. 107–163. *9 fig.* 1919.] Zeitschr. indukt. Abstamm. Vererb. **21**: 124–125. July, 1919.

782. Taylor, Noel. **A case of hermaphroditism in a lizard.** Proc. Zool. Soc. London **1918**: 223–230. *3 fig.* Mar., 1919.

783. Tchouproff, Al. A. **On the mathematical expectation of the moments of frequency distributions.** Biometrika 12: 140–169, 185–210. 1919.—A study of moments of frequency distributions from standpoint of theory of probability. Idea of expectation of independent and dependent events is basis of general developments which are specialized to give well known results.—Use of probability gives explicit hypotheses and sharply defined terminology and symbolism, and thereby ensures accuracy of thought.—*Rainard B. Robbins.*

784. Thompson, J. Arthur. **The new biology. Second part: Biochemistry and bio-physics. Livingness. Evolution.** Scientia 26: 208–219. 1919.—Author is conservative as to interpretation of nature in terms of matter and energy. The sciences are progressing toward greater correlation rather than unity.—Difficulties in synthesis of living organism are increasing rather than diminishing. Criteria of life are still vague. There is need of studying la-

tent life.—There is also need of critical experiments concerning origin of inherited variations. Discrepancy between Lotsy's recent statement, "of heredity we know nothing," and Morgan's conclusion, "The problem of heredity may be said to be solved," results from different view points. Former had in mind complex potentialities of germ cell, the latter merely the method of character distribution. Author distinguishes between apparent failure of an organism to inherit individually acquired body characters and the possibility of inheriting individual experiences. Results of Castle's experiments with hooded rats and Illinois experiments on protein content of corn (maize) will eventually be better understood [prophecy fulfilled]. Evolution of selected and of selection processes go hand in hand.—*L. B. Walton.*

785. Thompson, W. P. **The inheritance of the length of the flowering and ripening periods in wheat.** Proc. Trans. Roy. Soc. Canada 3: 69-87. 1918.—Reports results of crosses between many pairs of wheat varieties differing by many degrees in regard to length of ripening and heading periods. Crosses were made between parents differing only slightly, also crosses involving greater parental differences. F_1 plants matured with late parent. F_2 plants formed regular curves of probability with variation from below mean of lower parent to above mean of higher parent. Sometimes parental extremes were exceeded. Interpreting results on basis of multiple-determiner hypothesis of blending, the sum of the differences between each successive pair of parents seems to be much greater than it should be on the evidence of direct crosses. Hypothesis, therefore, fails to explain satisfactorily the results as a whole though it may explain satisfactorily the results of each individual cross.—*E. A. Southee.*

786. Thomson, J. Arthur. [French rev. of: Downing, E. R. **The third and fourth generation. An introduction to heredity.** *xi+164 p., 13 fig.* Univ. Chicago Press: Chicago, 1918.] Scientia 27: 72-74. Jan., 1920.

787. Thomson, J. Arthur. [French rev. of: Morgan, T. H., A. H. Sturtevant, H. J. Muller, and C. B. Bridges. **The mechanism of Mendelian heredity.** *xii+262 p., 64 fig.* A. Constable & Co.: London. 1915.] Scientia 27: 74-75. Jan., 1920.

788. Tischler, G. **Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei Lythrum Salicaria mit Beziehung auf das Illegitimitätsproblem. [Studies of the anatomical structure of the stamens and carpels in Lythrum Salicaria with reference to the problem of illegitimacy.]** Flora 11, 12 (Festschrift Stahl): 162-192. 1918.—Haploid number of chromosomes of *Lythrum salicaria* is almost certainly 24, diploid 48. Chromosomes are unequal in size, which in different flowers is considered due to nutrition. Genotypical differences of heterostyled plants are not correlated with chromosome size. Nuclei of mature pollen grains of heterostyled individuals having same chromosome number are apparently of same size, consequently the cell contents differ very much in amount since the pollen of the smallest and medium-sized stamens is contrasted with that from the largest in size. Characteristic size variations of the cells of the heterostyled plants are also shown in ovules, ovarian tissue, and in stigmas. Müller's generally accepted statement that the stigmatic papillae show typical differences is not confirmed. Short-styled flowers have larger papillae than medium or long-styled. Relatively small number of measurements of stigmatic papillae from plants with different flower forms give a normal curve with no suggestion of three modes. The size of the stigmatic papillae and also the papillate epidermal cells of *Lythrum* vary with the nutrition, corresponding with the supply of water and other materials. A parallel exists between heterostyly and dioecism. Within the same families or even the same genera, as for example, Lythraceae, Oxalidacae, Rubiacae, Caryophyllacae, Primulacae and Polygonadae, heterostyly and cleistogamy occur together while heterostyly and dioecism are seldom found associated. A morphological adaptation of the pollen grains to particular styles or stigmas does not exist Only to chemical agency can the partial but not absolute self-sterility of *Lythrum salicaria* be attributed. [See also Bot. Absts. 4, Entry 815.]—*D. E. Jones.*

789. Tischler, G. **Analytische und experimentelle Studien zum Heterostylie-Problem bei Primula. [Analytical and experimental studies on the problem of heterostyly in Primula.]**

Festschrift zur Feier des 100-jährigen Bestehens der Kgl. Württ. Landwirtsch. Hochsch. Hohenheim. p. 254–273. *4 fig.* April, 1918.—The size of the stigmatic papillae of *Primula* can be experimentally modified, being dependent upon nourishment. By early defoliation and subjecting the plants to darkness the flowers are greatly starved and the papillae correspondingly reduced so that the lengths of the hairs on long-styled flowers, with mature well developed stigmas up to the time of pollination, are brought below the normal for the short-styled forms. The latter are less influenced by this treatment. The modification of the stigmatic hairs or papillae is interpreted as osmomorphosis in the sense of Küster. The lack of nutrition, independently of the shortening of the papillae, may increase the distance from the stigma to the anthers in the long-styled form and decrease the distance in the short-styled form. The degree of heterostyly will therefore sometimes be greater and sometimes less, so that in extreme cases homostyly is produced. Pollen grain size is not modified in the same way as the length of papillae. Even with great lack of nourishment part of the grains may have normal size. However, many abortive grains are shown, especially in *Primula sinensis*, as well as grains above normal size. The Darwinian and Lamarckian correlation between the amount of heterostyly and the development of the pollen and stigmatic papillae size can not be due therefore to genotypical differences, but is best looked upon as a coincidence arising from the morphological ecology. [See also Bot. Absts. 4, Entry 719.]—*D. F. Jones.*

790. Tischler, G. **Das Heterostylie-Problem. [The problem of heterostyly.]** Biol. Zentralbl. 38: 461–479. Nov., 1918.—Review of writer's previous publications (see Bot. Absts., two preceding entries, 788, 789) and of the work of others on heterostyly in various species, leading to the conclusion that the degree of this phenomenon is variable, due to the environmental factors and can not be put on a genotypical basis.—*D. E. Jones.*

791. Tischler, G. [Rev. of: Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich. Eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. (Hybridization as cause of apogamy in the plant kingdom. An hypothesis for experimental genetics and evolution.)**] *666 p., 2 pl., 172 fig.* Gustav Fischer: Jena, 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 130–134. July. 1918.

792. Tischler, G. [German rev. of: Ziegler, H. E. **Die Vererbungslehre in der Biologie und in der Soziologie. (Genetics in biology and sociology.)** *xvi+479 p., 8 partly colored pl., 114 fig.* Gustav Fischer: Jena, 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 192–199. Sept., 1919.

793. Tjebbes. [Rev. of: Heribert-Nilsson, N. **Experimentelle Studien über Variabilität, Spaltung, Artbildung und Evolution in der Gattung Salix. (Experimental studies on variability, segregation, speciation and evolution in the genus Salix.)** Lunds Univ. Arsskr. N. F. Afd. 2. 14 (No. 28): 1–145. *65 fig.* 1918.] Genetica 1: 555–557. Nov., 1919.

794. Tower, W. L. **The mechanism of evolution in Leptinotarsa.** Carnegie Inst. Washington Publ. 263. *viii + 384 p., 19 pl., 161 fig.* 1918.—In architecture of germinal material author distinguishes two major kinds of agent, basal and definitive. Basal agents are properties of whole type and do not segregate. They are (*a*) basal factors, few in number, never altered and never interchanged, probably mixture of ground-substance colloids, and (*b*) chromatic receptors, substratum on which majority of determining agents are located (in nucleus). Definitive agents are (*a*) few, always associated with basal factors in cytoplasm, and (*b*) chromatic determiners, most numerous and commonly interchangeable in crossing. Experiments have demonstrated in *Leptinotarsa* 9 basal factors (haploid number of chromosomes is also 9), and in some cases 2 chromatic receptors for each basal factor. About 50 chromatic determiners have been discovered, many of them capable of fragmentation. Factors make several things possible, determiners decide which occur. Location of agents unknown, unlikely that observed phenomena are due to chromosome behavior. Reaction is chemical, rather than morphological. Whole germ cells is germ plasm, not some part of it. Eggs contain both factors and determiners, sperms only determiners. Female parent deter-

mines rate of growth, form, symmetry, etc., both parents determine details. In general, Mendelian principles govern.—Interspecific crosses give varying results. *L. signaticollis* × *L. diversa* give F_1 truly intermediate in all respects, and F_2 consisting of 1 *diversa* : 2 mid-type : 1 *signaticollis*. Total type remains as unit, no interchange occurs. These are results when rate of ontogenetic development (*Ac*) is same in both species. When *Ac* is made different for two species, by climatic changes, result of cross *suggests* that one parent is heterozygous, other homozygous; but apparent *signaticollis* type in F_1 is shown to be masked heterozygote, a fixed hybrid, breeding true. Group of determiners is bound together in firm association. These fixed hybrids, if discovered in nature, would have been regarded as new species (mutant).—*L. undecimlineata* × *L. signaticollis* exhibit three groups of characters (elytral pattern, larval pattern, lipoid color) which dissociate as groups. F_1 is uniform, and reciprocals are alike in adult, but maternal in larva. When *Ac* values are same, F_2 gives typical tri-hybrid results. With *Ac* conditions different, results are various. Under one set of conditions F_1 consisted of 1 *undecimlineata* : 2 mid-type : 1 *signaticollis*, each with different behavior in F_2. Changing temperature further complicated results.—*L. decemlineata* ♀ × *L. diversa* ♂ gave F_1 and F_2 pure *decemlineata* in appearance but *diversa* in rate of growth and food preference.—*L. decemlineata* × *L. oblongata* gave F_1 in variety of combinations of parental characters, falling into three general classes, *decemlineata*, intermediate, and *oblongata*, each with different behavior in F_2.—*L. decemlineata* × *L. multitaeniata* gave F_1 with *decemlineata* dominant (modifiable by external conditions) and F_2 on the whole of three types, *decemlineata*, heterozygotes, and *multitaeniata*.—Analysis of heterogeneity of certain pattern characters indicates that biotypes may be isolated. One biotype was observed to arise from another, perhaps due to change in environment. Attempts to accumulate quantitative differences have failed, but syntheses of characters have been readily possible. General population in several regions was analyzed and found to be different in each, but difference is not attributed to environment.—*A. Franklin Shull.*

795. Trateur, J. L. **La nature de la télégonie. [The nature of telegony.]** Réunion soc. belge biol. **1919**: 883–884. 1919.

796. Tufts, W. P. **Almond pollination.** California Sta. Bull. **306**: 337–366. *15 fig.* 1919. —Self-sterility and inter-fertility of commercial varieties affect choice of varieties and systems of planting. Even in interfertile varieties it is important to know commerical value of pollenizer, time of bloom, and amount and germinability of pollen of varieties used as pollenizers. Blooming periods and production of pollen in almond varieties are reported. Almond varieties are roughly divided into two classes: early and late bloomers. First blossoms in certain varieties each season may yield a smaller amount of pollen of inferior viability to that produced by flowers on same tree several days later. There is considerable variation in amount of pollen produced in different varieties. Satisfactory artificial germination was secured in 12 per cent cane sugar solution. All seventeen varieties thus far tested have proved self-sterile at least in certain years. Certain varieties are intersterile. A list of satisfactory pollenizers for important commerical varieties is given. Pollenizing agencies such as honey bees are necessary for a good crop. One colony of honey bees should be provided for each acre of orchard.—*E. B. Babcock.*

797. Tufts, W. P. **Pollination of the Bartlett pear.** California Sta. Bull. **307**: 369–390. *8 fig.* 1919.—Experiments to determine whether Bartlett pears are benefited by cross-pollination. Production and viability of pollen of varieties used was determined in 12 per cent cane-sugar solution. Blooming period in Bartlett is longer than in other varieties tested. Bartlett is only partially self sterile in valleys and practically so in foothills. Author recommends interplanting of other varieties for cross-pollination. No cases of inter-sterility were found. Any variety with same flowering period may be used. Cross-pollinated Bartletts are less inclined to June drop than self-pollinated. As pollinating agents one colony of honey bees should be provided per acre of orchard.—*J. L. Collins.*

798. UDA, HAJIME. On the relations between blood color and cocoon color in silkworms, with special reference to Mendel's law of heredity. Genetics 4: 395–416. Sept., 1919.—New race of silkworm with yellow blood (and yellow silk glands) spins white silk. Ordinary races with yellow blood spin yellow sillk; races with white blood spin white silk. A pure-bred yellow-blood, white silk × pure white-blood, white silk, gives in F_1 all yellow-blood, yellow-silk, i.e., yellow blood is completely dominant over white, white silk disappears, replaced by yellow. $F_2 = 9$ yellow blood and yellow silk + 3 yellow blood, white silk + 4 white blood and white silk. Interaction between two genes occurs, *C* turning blood yellow, but by itself not affecting silk, and *Y* which affects visibly neither blood nor silk unless combined with *C*, when it makes silk yellow. Abundant evidence from F_3 and back crosses with both pure parent breeds sustains this interpretation.—Pure white-blood white-silk strains differ *in re Y*, being demonstrably *cc Y Y*, *cc Yy*, or *ccyy*. Tested by mating with *CC Yy* (i.e., F_1 ex yellow blood, yellow silk × yellow blood, white silk), *cc Y Y* uniformly threw all yellow blood and yellow silk, *ccyy* uniformly threw 50 per cent yellow blood and yellow silk, 50 per cent yellow blood, white silk. For 6 generations of white these tests were repeated, neither strain showing any tendency toward *cc Yy*, which by same test threw 3 yellow blood and yellow silk: 1 yellow blood, white silk.—*J. H. Gerould.*

799. VAN HERWERDEN, M. A. [Rev. of: CONKLIN, EDWIN G. Heredity and environment in the development of men. *2nd ed., 550 p.* Princeton Univ. Press: Princeton, 1918.] Genetica 1: 553–554. Nov., 1919.

800. VAN HERWERDEN, M. A. [Dutch rev. of: GUYER, M. F., AND E. A. SMITH. Studies on cytolysins. I. Some prenatal effects on lens antibodies. Jour. Exp. Zool. 26: 65–82. 1918.] Genetica 2: 60–61. Jan., 1920.

801. VAN HERWERDEN, M. A. [Dutch rev. of: KUTTNER, OLGA. Untersuchungen über Fortpflanzungsverhältnisse und Vererbung bei Cladoceren. (Studies on reproductive relations and heredity in Cladocera. Inaug.-Diss. Freiburg. 1909; Internation. Rev. d. gesamm. Hydrobiol. 2: 1909.—BANTA, A. M. Sex and sex-intergrades in Cladocera. Proc. Nation. Acad. Sci. [U. S.] 4: 373. 1918.] Genetica 2: 68–69. Jan., 1920.

802. VON GRAEVENITZ. [German rev. of: GATES, R. R. On the origin and behavior of Oenothera rubricalyx. Jour. Genetics 4: 353–360. 1915.] Zeitschr. indukt. Abstamm. Vererb. 21: 191. Sept., 1919.

803. VON GRAEVENITZ. [Rev. of: SAUNDERS, EDITH R. On the occurrence, behavior and origin of a smooth-stemmed form of the common foxglove (Digitalis purpurea). Jour. Genetics 7: 215–228. 1918.] Zeitschr. indukt. Abstamm. Vererb. 21: 187–188. Sept., 1919.

804. VON GRAEVENITZ. [German rev. of: SAUNDERS, EDITH R. Studies in the inheritance of doubleness in flowers. II. Meconopsis, Althaea, and Dianthus. Jour. Genetics 6: 165–184. 1917.] Zeitschr. indukt. Abstamm. Vererb. 21: 188–189. Sept., 1919.

805. VON GRAEVENITZ, [German rev. of: SUTTON, IDA. Report on tests of self-sterility in plums, cherries and apples at the John Innes Horticultural Institution. Jour. Genetics 7: 281–300. *3 fig.* Aug., 1918. (See Bot. Absts. 1, Entry 945.)] Zeitschr. indukt. Abstamm. Vererb. 21: 191–192. Sept., 1919.

806. VON SEELHORST, C. Transmission of characters. Jour. Landw. 66: 141–162. 1918.

807. VON TSCHERMAK, E. Steigerung der Ertragsfähigkeit der Tomaten durch Bastardierung in der ersten Generation. [Increase of productivity of tomatoes through hybridization in the first generation.] Nachr. Deutsch. Landwirtschaftsgesell. Osterreich 1918: 425–426. 1918.

808. von Ubisch, G. [Rev. of: Backhouse, W. O. Note on the inheritance of "crossibility." Jour. Genetics 6: 91–94. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 142. July, 1919.

809. von Ubisch, G. [German rev. of Backhouse, W. O. The inheritance of glume length in Triticum polonicum. A case of zygotic inhibition. Jour. Genetics 7: 125–133. Feb., 1918. (See Bot. Absts. 1, Entry 211.)] Zeitschr. indukt. Abstamm. Vererb. 21: 190–191. Sept., 1919.

810. von Ubisch, G. [Rev. of: Caporn, A. St. Clair. The inheritance of tight and loose paleae in Avena nuda crosses. Jour. Genetics 7: 229–246. 1918. (See Bot. Absts. 1, Entry 866.)] Zeitschr. indukt. Abstamm. Vererb. 21: 143. July, 1919.

811. von Ubisch, G. [Rev. of: Caporn, A. St. Clair. An account of an experiment to determine the heredity of early ripening in an oat cross. Jour. Genetics 7: 247–257. 1918. (See Bot. Absts. 1, Entry 867.)] Zeitschr. indukt. Abstamm. Vererb. 21: 129–130. July, 1919.

812. von Ubisch, G. [Rev. of: Caporn, A. St. Clair. On a case of permanent variation in the glume length of extracted types and the inheritance of purple colour in the cross Triticum polonicum × Tr. Eloboni. Jour. Genetics 7: 259–280. 1918. (See Bot. Absts. 1, Entry 868.)] Zeitschr. indukt. Abstamm. Vererb. 21: 143–144. July, 1919.

813. von Ubisch, G. [Rev. of: Emerson, R. A. The calculation of linkage intensities. Amer. Nat. 50: 1411–1420. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 125–129. July, 1919.

814. von Ubisch, G. [Rev. of: Riebesell, P. Die mathematischen Grundlagen der Variations- und Vererbungslehre. (The mathematical principles of variation and heredity.) Math. Bibliothek 24: 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 119. July, 1919.

815. von Ubisch, G. [Rev. of: Tischler, G. (1) Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei Lythrum Salicaria, mit Beziehung auf das Illegitimitätsproblem, (Studies of the anatomical structure of the stamens and carpels in Lythrum Salicaria, with reference to the problem of illegitimacy.) Flora 11, 12: (Festschrift Stahl): 162–192. 1918. Ibid. (2) Analytische und experimentelle Studien zum Heterostylie-Problem bei Primula. (Analytical and experimental studies on the problem of heterostyly in Primula.) Festschr. z. Feier des 100-jährigen Bestehens d. kgl. württ. landw. Hoschschule Hohenheim. *254–273 p., 4 fig.* April, 1918. Ibid. (3) Das Heterostylie-Problem. (The problem of heterostyly.) Biol. Zentralbl. 38: 461–479. Nov., 1918. (See Bot. Absts. 4, Entries 719, 788, 789, 790.)] Zeitschr. indukt. Abstamm. Vererb. 21: 247–248. Nov., 1919.

816. von Ubisch, G. [Rev. of: Trow, A. H. On the number of nodes and their distribution along the main axis in Senecio vulgaris and its segregates. Jour. Genetics 6: 1–63. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 142–143. July, 1919.

817. von Ubisch, G. [German rev. of: Trow, A. H. On "albinism" in Senecio vulgaris L. Jour. Genetics 6: 65–74. 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 189–190. Sept., 1919.

818. Walther. [Rev. of: Lloyd-Jones, Orren, and John M. Evvard. Inheritance of color and horns in blue-gray cattle. Agric. Exp. Sta. Iowa College Agric. Res. Bull. 30: 67–106. *10 fig.* 1916.] Zeitschr. indukt. Abstamm. Vererb. 21: 121–122. July, 1919.

819. Wells, R. W. (Floral prolification in Allium mutabile.) Plant World 22: 351–352. 1919.—Notes the development of flowers from staminal primordia.—*J. Arthur Harris.*

820. Westphal, A. **Über familiäre Myoklonia und über Beziehungen derselben zur Dystrophia adiposo-genitalis. [On familial myoclonia and on its relation to dystrophia adiposa-genitalis.]** Deutsch. Zeitschr. Nerven. 58: 1918.

821. Wiggans, C. C. **Some factors favoring or opposing fruitfulness in apples.** Missouri Agric. Exp. Sta. Res. Bull. 32: 1–60. *6 fig.* 1918.

822. Witte, Hernfrid. **Själfbefruktningens inverkan på afkommans utveckling hos timotejen. [Effect of inbreeding on the development of progeny in timothy.]** Sver. Utsädesf. Tidskr. 29: 86–90. 1919.—Timothy is usually cross-pollinated. When individual plants or heads are isolated only a very few seeds are formed, showing partial self sterility. The progeny from selfed seed when compared with their vegetatively propagated parent plant showed an average decrease of 15 to 35 per cent in height and 20 to 65 per cent in dry weight. Only rarely did any progeny plant equal its parent in vigor. Open-pollinated progeny showed no significant deviation from the parent.—*E. G. Anderson.*

823. Witte, Hernfrid. **Breeding timothy at Svalöf.** Jour. Heredity 10: 291–299. *1 pl., 5 fig.* Oct., 1919.—The author states the extent of meadow culture in Sweden and gives a brief description of his theory and methods of breeding timothy. There follows a brief discussion of the variation and heredity of certain characters as: length of stem, number and length of internodes, thickness of stem, direction of stem, size and color of leaves, form and size of head, variations of flower parts, physiological characters, aftergrowth and disease resistance. There is evidence that these characters are heritable but pure-line selection or breeding is not attempted due to the fact that timothy is open-pollinated. Clonal propagation, individual and mass selections are practised. Practical results show 12 and 20 per cent increase in yield, respectively, of Primus and Gloria timothy in comparative tests with ordinary Swedish timothy. Above varieties are resistant to rust and are high yielders of seed.—*Maxwell J. Dorsey.*

824. Woods, F. A. **Racial origins and honors of war.** Jour. Heredity 10: 332. 1919.—An analysis of the relation between line of descent and valor in war as indicated by the names of those soldiers who won distinguished service medals in the 26th Division.—*Maxwell J. Dorsey.*

825. Woodworth, C. M. **The application of the principles of breeding to drug plants, particularly Datura.** Bull. Univ. Wisconsin 1005. *32 p., 15 fig.* Nov., 1919.—Bulletin was prepared with the feeling that modern principles of breeding should be more generally applied to drug plants with a view to their improvement. Technique of crossing is described and a scheme for improvement in alkaloid content suggested.—*A. F. Blakeslee.*

826. Wriedt, Chr. **Über die Vererbung von Ohrenlänge beim Schafe. [On the inheritance of ear length in sheep.]** Zeitschr. indukt. Abstamm. Vererb. 20: 262–263. Feb., 1919.—Short-eared forms occur among ancient types in many regions of Norway, but have very nearly disappeared because of the wide use of Cheviot rams. Author crossed short-eared ewe to Oxford ram, obtaining a short-eared lamb. Author has additional records on 3 short-eared sheep in a flock of 10, and found long-eared types never gave short-eared. Concluded that short-eared type is a Mendelian dominant. Results agree with those of Rietzman. However, a recent record on an earless type seems to indicate that short-eared are heterozygotes, for short-eared × short-eared gave 1 long-eared + 5 short-eared + 1 earless.—*J. A. Detlefsen.*

827. Yampolsky, Cecil. **Inheritance of sex in Mercurialis annua.** Amer. Jour. Botany 6: 410–442. *Pl. 37–40, fig. 1.* 1919.—Author secured both female and male plants of *Mercurialis annua.* The female plants bore a few male flowers the pollen of which was used to fertilize the female flowers and thus procure seeds from the female plant. Some of the male plants produced a few female flowers which were pollinated with pollen from the male plant and a few seeds thus obtained from the male plants. All seedlings from female plants were prevailingly females; these in turn produced female plants in the next generation when pollinated from the few male flowers which developed upon the plant; similar results were obtained in

the third and fourth generation. All of the seedlings obtained from the male plants were prevailingly male, only a few developing a few female flowers. The same results were obtained in the second generation in the male plants. Observations on this species show plants which produce only female flowers, others which produce only male flowers, and others which show gradations between pure femaleness and pure maleness. A rather extensive review of the literature on inheritance in sex, especially in plants, is given, and the general conclusion reached that the sex of the plant is not determined by the production of two kinds of eggs which are distinctly male-producing or female-producing or by two kinds of pollen grains, as believed by Bateson and Correns, but that there are gametes of "graded potencies," some prevailingly or exclusively male-producing, others prevailingly or exclusively female-producing, others more strictly monoecius-producing.—*Chester A. Darling.*

828. Zeleny, Charles. **The mutational series, full to bar to ultra bar, in Drosophila.** Anat. Rec. 17: 336. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Ultra-bar appeared in a single male in the second generation of downward selection in white bar on November 20, 1917. The stock established from it averaged 23 facets in the males as opposed to 75.6 facets in the bar stock from which it was derived and 849.8 facets in full eye. It has remained constant since that time except for the appearance of a few additional mutations. The interest in this mutant lies in the following facts. It is not due to an accessory factor, but is a change in the bar gene itself. The changed gene produces a somatic effect which is an intensification of that produced by bar. This effect is in the direction of selection. The dominance is greatly increased. Ultra-bar and the various other races of bar furnish unusual material for a quantitative study of both germinal and environmental factors.—*Charles Zeleny.*

829. Zeleny, Charles. **The tabulation of factorial values for eye-facet number in the bar races of Drosophila.** Anat. Rec. 17: 337–338. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—In working up the data obtained in a study of the germinal and environmental factors affecting eye-facet number in the bar races of *Drosophila*, it became evident that the demands of biological analysis were not adequately met by the system of arrangement in classes with equal facet numbers. It has been shown by Krafka that the effect of temperature upon the mean facet value of a stock is approximately proportional to the mean value of that stock. A change of one degree in temperature in a 200-facet stock produces ten times as much change in facet value as it does in a 20-facet stock. The probability that other factors affecting facet number may act in a similar way is discussed, and the conclusion is reached that a tabulation in classes with equal facet numbers does not give as close an approximation to true factorial values as a tabulation in which the range of each class is equal to a definite fixed per cent of the mean facet value of its class. In the latter case the classes may be taken to represent equal factorial values though the facet ranges are unequal. The variation constants can then be put directly in factorial units. Such a scheme is especially valuable in the graphic representation of selection data in which the mean of the unselected stock is taken as the point of departure, and any facet value can be represented as plus or minus a certain number of factorial units from the mean of the unselected stock.—*Charles Zeleny.*

830. Zeleny, Charles. **Forty-two generations of selection for high- and low-facet number in the white bar-eyed race of Drosophila.** Anat. Rec. 17: 338–339. Jan. 20, 1920.—[Author's abstract of paper read before American Society of Zoologists, St. Louis, December 30, 1919.]—Following the discovery of the pronounced effect of temperature upon eye-facet number in *Drosophila*, a careful control of that factor has made possible a better analysis of the results of selection than that obtained in the earlier work of Zeleny and Mattoon, May and Zeleny. The present paper deals with forty-two generations of selection in a white-bar race. With accurate temperature control it is possible to isolate the occasional mutants as they arise and to demonstrate that if they are not included in the series, selection ceases to be effective after three to five generations. Crosses between the high and low lines confirm the

results of previous selections and show that the difference between high and low is in large part, if not wholly, due to accessory factors outside of the sex chromosome in which the bar gene is located. There is no evidence that variability of the bar gene is a factor in this effect, which is purely a matter of the sorting of differences existing in the stock at the beginning of selection. There is, however, no limit to the possibilities of selection if the occasional mutants are included in the series, and two at least of these, reversal to full and ultrabar, have been shown to changes in the bar gene itself.—*Charles Zeleny.*

831. Zinn, Jacob. **On variation in Tartary buckwheat, Fagopyrum tataricum (L.) Gaertn.** Proc. Nation. Acad. Sci. U. S. Amer. 5: 506–514. Nov., 1919.—Normally 50 per cent or more of this race have 3 carpels. Unusual conditions (high humidity and temperature) shift the mode (67 per cent) to 4 (abnormal), range 3 to 25. Abnormal perigones, up to 18 parts, are distinctly correlated with above. Race comes from single abnormal individual, and behaves in inheritance as eversporting variety, selection of abnormal extremes being ineffective. Abnormalities are most frequently at certain nodes. Full account to be published in Genetics.—*Merle C. Coulter.*

HORTICULTURE

J. H. Gourley, *Editor*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

832. Ahmed Bin Haji Omar. **Races of the coconut palm.** Gardens' Bull. Straits Settlements 2: 143. *3 pl.* 1919.—Fourteen varieties of Singapore coconuts are briefly characterized; photographic plates show the end view, side view, and cross section of the nut of each. —*S. F. Trelease.*

833. Anonymous. **A new and promising rose.** [Rev. of: Van Fleet, Dr. W. New pillar rose. Jour. Heredity 10: 136–138. *2 fig.* 1919.] Florists' Exchange 47: 1161. 1919.—Parentage, description and habits given of a new rose seedling which gives much promise among the hardy pillar or low climbing sorts. He includes among its ancestors the new Chinese *Rosa Soulieana*, *R. setigera*, *R. Wichuraiana* and a Tea Rose.—*L. A. Minns.*

834. Anonymous. **A substitute for glass.** Nation. Nurseryman 27: 315. 1919.—A substitute for glass to be used in greenhouse work is reported to be on the market in England. It is composed of water and white gelatinous substance worked on to a pliable but strong foundation of fine wire or fabric netting. The weight is only a fraction of that of glass and breakage is reduced to almost nothing. Transmission of light is only slightly less than with glass and it promises to be an economical substitute for the latter.—*J. H. Gourley.*

835. Anonymous. **Celastrus obiculatus.** Nation. Nurseryman 27: 289. 1919. *1 fig.*—The Japanese bittersweet (*Celastrus obiculatus*) can be trained into "standard' form and is recommended for garden planting as more showy than our native species.—*W. N. Clute.*

836. Anonymous. **Chionanthus Virginica.** Nation. Nurseryman 27: 185, 186. *1 fig.* 1919.—The staminate form of the fringe tree (*Chionanthus Virginica*) is the showiest, but the blue-black fruit of the pistillate plant is an added decorative feature and the fruit is much relished by birds. The species is hardy as far north as Massachusetts and Northern Illinois but may be injured in severe winters.—*W. N. Clute.*

837. Anonymous. **Halesia tetraptera, var. monticola.** Nation. Nurseryman 27: 292. 1919.—The form of *Halesia tetraptera* growing in elevated parts of the Southern States has been distinguished from the lowland form as var. *monticola*. The leaves are less hairy, the flowers a third larger and the fruit twice as large. The variety grows in tree form often 80 feet high and is recommended for street planting.—*W. N. Clute.*

838. Anonymous. New rose, Frank W. Dunlop. Florists' Exchange 47: 900. *Fig. 1.* 1919.—Originated by John H. Dunlop, Toronto, Canada. Parentage and distributors in U. S. A. given.—*L. A. Minns.*

839. Anonymous. New seedling rose, Mrs. John Cook. Florists' Exchange 47: 493. *Fig. 1.* 1919.—Parentage, description and originator given.—*L. A. Minns.*

840. Anonymous. Raffia. Nation. Nurseryman 27: 13. 1919.—An article is quoted from the Australian International Nurseryman by E. E. Prescott on the source of raffia (*raphis raffia*). The palms from which it is obtained grow in profusion in Madagascar, and are described as magnificent and gigantic, the leaves often measuring 60 feet in length and 30 to 40 feet in width. They are not of use economically until their seventh year, and they die shortly after their twentieth year when they flower. Its use at the "front" as a material for camouflage purposes is described.—*J. H. Gourley.*

841. Anonymous. Rose Mme. Butterfly. Florists' Exchange 47: 597. *Fig. 1.* 1919.—Parentage, description and originator given.—*L. A. Minns.*

842. Anonymous. Rose Premier. Florists' Exchange 47: 547. *Fig. 1.* 1919.—Parentage, description, good qualities and originator given.—*L. A. Minns.*

843. Anonymous. Sobarias. Nation. Nurseryman 27: 65, 66. *1 fig.* 1919.—The Sobarias are usually listed by nurserymen as spiraeas. The commonest species in cultivation is *S. sorbifolia. S. arborea* is illustrated. The first mentioned blooms earliest followed by *S. stellipilla, S. asurgens,* and *S. arborea. S. Aitchinsonii* blooms in September.—*W. N. Clute.*

844. Anonymous. List of seeds of hardy herbaceous plants and of trees and shrubs. Kew Bull. Misc. Inf. [London] 1919: Appendix 1–23. 1919.—This is a list of seeds, matured at Kew during 1918, and available for exchange.—*E. M. Wilcox.*

845. Anonymous. The dahlia. Missouri Bot. Gard. Bull. 7: 41–46. *Pl. 12–13.* 1919.—The history, varietal classification, and culture of dahlias. Forty-nine varieties are listed that were grown in the St. Louis gardens in 1918, with descriptive characters.—*O. T. Wilson.*

846. Anonymous. Agricultural possibilities of the Sahara. Sci. Amer. Supplem. 87: 297. 1919.

847. Anonymous. Notizie varie. [Various notices.] Bull. R. Soc. Toscana Orticult. 4: 67–68. 1919.—Notes concerning: varieties of Nymphea, "Veronica Traversi," "Amygdalopersica Formonti," and the color of roses.—*W. H. Chandler.*

848. Anonymous. The castor bean and its many uses. Sci. Amer. 120: 528, 530. 1919.

849. Arnold, Geo. Forget-me-nots naturalized. Florists' Exchange 47: 495. *Fig. 1.* 1919.—The author reports places (near Rochester, N. Y.) where biennial forget-me-nots, probably *Myosotis alpestris* of the catalogs, have become naturalized to a considerable extent on uncultivated and unmown soil. Very favorable growth is made in shade of trees. The soil is gravelly loam, and not especially moist, but the air is unusually moist as the place is surrounded by a lake, deep glens and wooded hills.—*L. A. Minns.*

850. Baxter, Samuel Newman. Pagoda tree of Japan. Nation. Nurseryman. 27: 97, 98. *2 fig.* 1919.—*Sophora Japonica* has the habit of blooming in midsummer making it a desirable tree for planting. The largest specimen in the vicinity of Philadelphia grows on the Buist estate and measures three feet in diameter at the base with a spread of 70 feet. The ground surrounding this tree has been set aside as a park in order to preserve it.—*W. N. Clute.*

851. Boynton, Kenneth R. **Arctotis grandis.** Addisonia 4: 45, 46. *Pl. 143 (colored).* 1919.—A south African species with strikingly colored flowers, frequent in American flower gardens.—*T. J. Fitzpatrick.*

852. Boynton, Kenneth R. **Centaurea montana.** Addisonia 4: 57. *Pl. 149 (colored).* 1919.—Describes and figures this common flower garden perennial, a native of Europe.—*T. J. Fitzpatrick.*

853. Cropp, Carl. **Flower seed growing in America.** Seed World 6[1]: 20–21. 1919.

854. Fultz, F. M. **The lilies of the field. Beautiful and striking wild lilies of California's fields.** Sci. Amer. Supplem. 88: 92–94, 96. *17 fig.* 1919.

855. Griffiths, David. **Domestic production of Easter lily bulbs.** Florists' Exchange 47: 443, 468 1919.—The author reports on investigations in growing Easter lilies from seed now being conducted by the United States Department of Agriculture in its greenhouses at Arlington Farm, near Washington. The group of lilies included seedlings of 1916, and subsequent years, some of which had been forced in 1918 and then produced a crop of seed; plants of the Creole lily of the South; and a few seedlings of Easter lily produced with *L. candidum* pollen. Attention is called to the desirability of growers having facilities to start seedling generations of Easter lilies for future use, as in two years 60 per cent of the seedlings can be forced into bloom for the Easter trade. [See also next following Entry, 856.]—*L. A. Minns.*

856. Griffiths, David. **Easter lily bulb production.** Florists' Exchange 48: 775. *1 fig.* 1919.—It is possible for the florist to produce his own bulbs of Easter lily from seed in one year's time at a minimum expense. These stocks are hardy under proper treatment as far north as Washington and consequently can be produced out of doors, can be grown on from year to year as a permanent out-of-door crop, and can be set out to finish off after the season of bloom has passed if the stems are not cut too short. Those bulbs from which flowers with a minimum of stem have been cut will recuperate perfectly with one year of outdoor culture while those cut at the surface of the pots behave peculiarly. The proper method of handling them is under investigation. It is not necessary to carry seedlings in pots through their first flowering. Last winter the seed was sown in flats the 15th day of January, 9000 seedlings pricked into thumb pots in March, the plants set in the field the first of May. The first blossoms appeared in late July and as late as October 22 were continuing in blossom. Some of the plants had as high as eight flowers to the stem. These will make good forcing stock for next fall's use. Five per cent of them are large enough to force. From seedlings brought to forcing size—which may be said to take two years under outdoor conditions although it is said that it takes 3 years from bulblets in Japan—it is a simple matter to increase one's stock. Under conditions at Washington in two years from seed they are able to count on natural reproduction of from 3 to 4 stem bulblets, 5 to 7 cm. in circumference. When well handled these will produce good forcing bulbs which will give from 3 to 5 flowers after one year of outdoor culture. In 2 years' outdoors they will make bulbs 7 to 9 inches in circumference, which is as large, if not larger, than it is profitable to force. [See also next preceding Entry, 855.]—*L. A. Minns.*

857. Judd, Wm. H. **Ornamental trees and shrubs of merit for New England.** Nation. Nurseryman 27: 80–81, 110–111. 1919.

858. Landini, L. **L'impianto dei giardini lungo la spiaggia meridional Adriatica. [The planting of the gardens along the meridional coast of the Adriatic.]** Bull. R. Soc. Toscana Orticult. 4: 64–66. 1919.—Practical directions as to the best varieties of plants for gardens along the meridional coast of the Adriatic.—*W. H. Chandler.*

859. Matthews, Edwin. **Shade loving plants.** Florists' Exchange 47: 203. *Fig. 2.* 1919.—The author answers the vexed question of what to plant and have do well in the shade by listing shrubs under two groups as (1) those which do well in shade and (2) those which

thrive in shade indifferently. Various shady locations such as under surface-rooting trees, deep-rooting trees and dense-shading trees, and close to over-hanging eaves of houses are discussed.—*L. A. Minns.*

860. Miyoshi, Manabu. **Über der Erhaltung einer neuen wildwachsenden hängenden Varietat des Kastanienbaumes als Naturdenkmal [Concerning a new wild chestnut with weeping branches and its preservation as a Natural Monument].** Bot. Mag. Tokyo **33**: 185–188. *1 fig.* Sept., 1919.—See Bot. Absts. 4, Entry 452.

861. Mondino, Alfonsino. **Richerche anatomische e morphologiche sulla var. "tuberosa" Asch. dell "Arrhenatherum elatius" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological research of var. tuberosa Asch., of Arrhenatherum elatius, M. K. recently found in Piedmont.]** Atti. R. Accad. Sci. Torino **54**: 782–794. 1919.—See Bot. Absts. 4, Entry 988.

862. Nash, George V. **Crataegus spathulata.** Addisonia **4**: 47. *Pl. 144 (colored).* 1919.—Includes description, with notes on distribution, habitat, time of flowering, etc. This species of hawthorn is native of the southeastern United States. It was discovered by Michaux in South Carolina and characterized by him in his classic work. This shrub was early introduced into English and French gardens.—*T. J. Fitzpatrick.*

863. Nash, George V. **Hamamelis virginiana.** Addisonia **4**: 43, 44. *Pl. 142 (colored).* 1919.—Describes with notes this late fall flowering shrub or small tree, native of eastern North America.—*T. J. Fitzpatrick.*

864. Nash, George V. **Orontium aquaticum.** Addisonia **4**: 51, 52. *Pl. 146 (colored).* 1919.—A species of a monotypic genus, ranging from Massachusetts to Florida and Louisiana, inhabiting swamps, ponds, and rivers, usually not distant from the seashore.—*T. J. Fitzpatrick.*

865. Nash, George V. **Paphiopedilum rothschildianum.** Addisonia **4**: 41, 42. *Pl. 141 (colored).* 1919.—Gives a full description with comment of this showy perennial orchid formerly included in the genus *Cypripedium.* It is a native of the humid forests of Borneo Sumatra, and New Guinea and was introduced into cultivation in 1887. Short statements concerning related genera are given.—*T. J. Fitzpatrick.*

866. Nash, George V. **Viburnum lantana.** Addisonia **4**: 55, 56. *Pl. 148 (colored).* 1919.—Gives a description of the species with comment and contrast of related species. This ornamental shrub is a native of Europe, the Caucasus, and northern Africa. It responds readily to cultivation as do most of the species of the genus, giving us many of our very attractive ornamental shrubs.—*T. J. Fitzpatrick.*

867. Pack, C. L. **Central Park trees starving to death.** Amer. Forest. **25**: 1391–1400. *30 fig.* 1919.—See Bot. Absts 4, Entry 455.

868. Pammel, L. H. **Effect of winter on shrubs at Ames, Iowa.** Rep. Iowa State Hortic. Soc. **53**: 39–41. 1918.—The author gives a list of plants injured by cold during the winter of 1917–1918. Mention is made of the injury to Concord grape, in some places it killed to the ground. There was also serious injury to osage orange *Toxylon pomiferum, Liriodendron Tulipifera,* and *Sambucus racemosa.* Slight injury was noted to *Philadelphus coronarius* and *Ulmus campestris.* Many conifers like *Abies concolor, A. balsamea* and *Thuja occidentalis* suffered much in some places. Plants in a soil saturated with moisture are less injured than when the soil is comparatively dry. Covering of snow helps to protect plants. Such plants as *Rubus strigosus* and *Sambucus racemosa* frequently suffer at Ames, although perfectly hardy in Minnesota, with a greater covering of snow.—*L. H. Pammel.*

869. Payne, Theodore. **The California wild flower garden in Exposition Park, its history and objects.** Bull Southern California Acad. Sci. 18: 55–77. 1919.—The object and history of the wild flower garden in Exposition Park, San Diego, California is given by its originator with a l'st of the species growing therein.—*Roxana S. Ferris.*

870. Pennell, Francis W. **Alonsoa meridionalis.** Addisonia 4: 59, 60. *Pl. 150 (colored).* 1919.—Gives a full description of this interesting plant of the Figwort family, a native of the Andes of Columbia, where it appears as a weed.—*T. J. Fitzpatrick.*

871. Pennell, Francis W. **Penstemon hirsutus.** Addisonia 4: 49, 50. *Pl. 145 (colored).* 1919.—Gives full description of this delicate-flowered beard-tongue, contrasting it with *P. digitalis.* It is a native of northern United States and readily responds to cultivation. —*T. J. Fitzpatrick.*

872. Rose, J. N. **Echinopsis leucantha.** Addisonia 4: 53. *Pl. 147 (colored).* 1919.—A variable species of cactus, of wide distribution in Argentina. It does well in cultivation, freely flowering each spring.—*T. J. Fitzpatrick.*

873. Secker, A. H. **A new yellow fruited Jerusalem cherry.** Florists' Exchange 47: 285. *Fig. 1.* 1919.—This new Jerusalem cherry, a hybrid of Clevelandii, made its appearance at the establishment of J. B. Keller Sons, Rochester, N. Y., 3 years ago. The fruit is from lemon to dark orange in color, in striking contrast to its red-fruited parent.—*L. A. Minns.*

874. Shaw, J. Austin. **Fischer's new white freesia.** Florists' Exchange 47: 671. 1919. —Originated by Rudolph Fischer, San Gabriel, Calif., through selection; similar to Freesia Purity, but improved. Description given and introducer named.—*L. A. Minns.*

875. Smith, J. J. **Index Orchidacearum quae anno 1919 in Horto Botanico Bogoriensi coluntur. [Index of orchids grown during the year 1919 in the Buitenzorg Botanical Garden.]** Bull. Jard. Bot. Buitenzorg III, 1: 91–126. 1919.—The list contains over 1000 species, varieties and forms not included.—*J. J. Smith.*

876. Toole, William Sr. **Domesticating our native wild flowers.** Wisconsin Hortic. 9: 89–91. 1919.—Experiences in transplanting Wisconsin wild flowers are described and the view is expressed that many species thrive better under cultivation than in their native habitat.—*G. F. Potter.*

877. Waldron, C. B. **Factors in hardiness.** Rept. Iowa State Hortic. Soc. 53: 115–119. 1918.—See Bot. Absts. 4, Entry 1593.

878. Waldron, Ralph Augustus. **The peanut (Arachis hypogaea) its history, histology, physiology, and utility.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 301–338. *Pl. 79–80.* 1919. —See Bot. Absts. 4, Entry 139.

879. White, E. A. **Lilium longiflorum from seed.** Florists' Exchange 48: 53. *5 fig.* 1919.—An account of work done in the Dept. of Floriculture, Cornell University, on raising seedling lilies, confirming experiments by the Dept. of Agric., Washington, D. C. Vigorous plants in full bloom were produced in a little over eighteen months after seed sowing. Healthy seedlings do not result from self-fertilization. As a rule the strongest seedlings are obtained by crosses between varieties within the species, as, for example, *Lilium longiflorum* var. *formosum x formosum,* and var. *eximium x* var. *formosum.* Other experiments seemed to prove that hybridization between garden species may be successful. The seedlings have not yet flowered and are still under observation.—*L. A. Minns.*

FRUITS AND GENERAL HORTICULTURE

880. Ackerman, A. J. **Two leafhoppers injurious to apple nursery stock.** U. S. Dept. Agric. Bull. 805. *35 p. Pl. 1–5.* 1919.—Two distinct kinds of injury to apple nursery stock were observed by the author while working at West Chester, Pa. Investigations reported are for work carried on at this place and in Western Maryland. Two species of leaf hoppers, namely *Empoasca mali* and *Empoa rosae* cause the injury. Complete history, range of distribution, food habits, life history, character of injury, natural enemies and remedial measures for each are reported. Data on successful spraying experiments using 40 per cent nicotin sulfate of varying strength with and without fishoil soap (2 to 50) are also given. A list of publications on both species of leafhoppers is appended.—*E. V. Hardenburg.*

881. Alderman, W. H. **Fruit growing in West Virginia.** Trans. Indiana Hortic. Soc. 1918: 145–147. 1919.—Popular.

882. Alderman, W. H. **Is thinning fruit profitable?** Trans. Indiana Hortic. Soc. 1918: 75–91, 176–177. *1 fig.* 1919.—The author discusses the results of experiments on thinning of apples in West Virginia. The experiments were begun in 1912 on the varieties, York Imperial, Ben Davis, Rome, and Baldwin. The objects were: (1), to determine the effect of thinning on the size and quality of the fruit of that crop; (2) to determine the best time to thin; (3) to determine the effect on the next year's crop. The results over a 5-year period on a study of 41 varieties showed thinning to have a marked effect on the size of the fruit and it increased the amount of marketable fruit. There was no influence on the quality of the fruit except color. The color of the fruit was strikingly improved. The results also showed that the cropping habit of the tree could not be varied very much by thinning and the evidence would indicate that thinning of fruit had absolutely no effect of the crop of the succeeding year. Furthermore, from the evidence at hand there was nothing to indicate that thinning the fruit from the spur this year would cause it to fruit next year. The author states that the best time to thin is just after the June drop, from June 15, to July 1. The most satisfactory results in size and number of fruits per tree were obtained when the fruits were thinned from 6 to 7 inches apart on the branch. The author also states that if trees are bearing heavily and are not in the most vigorous condition, it will pay and pay well to thin for the sake of the one crop, but it should not be expected that the thinning will influence the crop of the succeeding year.—*F. P. Cullinan.*

883. Anonymous. **The new overbearing raspberry, La France.** Florists' Exchange 48: 738. *3 fig.* 1919.—Both fruit and foliage of this new raspberry, La France, were seen at the autumn flower shows in New York. The writer, on October 10, 1919, saw 40,000 plants in the nursery and private garden of the discoverer. The canes and leaves are stiffer than those of the Cuthbert, and have but few spines. La France sends out a great number of underground stems from which heavy shoots spring, sometimes at a distance of 10 feet from the parent plant, on which fruit is borne the first season. La France was fruiting heavily when seen, though frosts the two nights previous had nipped all tender vegetation. The fruit is borne in racemes, 1 to 3 feet long, on the under side of the tops of the canes. In one and the same raceme were seen buds, blooms, fruit just setting, and green and ripe berries. The individual berry of La France is about twice as heavy as that of the Cuthbert, and the drupes from two to three times as large as those of other berries. The berry is deep pink in color, juicy, and of delicious flavor. The owner stated that La France is a chance seedling, found by him in 1913, and tested for 6 years. It has a long bearing season, from the middle of June onward, and the autumn crop is heavier than the June crop. The canes of La France survived the winter of 1917–18 without injury, while standard varieties of raspberries and of blackberries were killed to the ground.—*L. A. Minns.*

884. Anonymous. **Trained fruit trees.** Nation. Nurseryman 27: 157. *1 fig.* 1919.—It is possible to train fruit trees to grow on walls in America as in Europe, the climatic conditions presenting no difficulties.—*W. N. Clute.*

885. Anonymous. **La piña, fruta Americana.** [The pineapple, an American fruit.] Revista Agric. [Mexico] 3: 452–457. *1 fig.* 1919.—Reprinted from Bull. Pan-American Union.

886. Anonymous. **Orchard heaters emitting smoke lighter than air, may be used.** California Citrograph 5: 20. 1919.—At the close of a lawsuit brought by orange growers to restrain the city of Pomona from enforcing the provisions of the Anti-Smudge Ordinance, Judge J. W. Shenk of the superior court of Los Angeles County, California ruled: First, that the municipality has no right to prohibit the emission of that degree and quality of smoke which is necessarily caused in the operation of the modern type of orchard heaters, carefully cared for and regulated. Second, that the courts will have in mind in determining the reasonableness of such ordinances the necessities of orchard heating, the magnitude of the interests, and the importance of the industry. Third, that the court will restrain municipalities and their officers from the enforcement of such ordinances containing unreasonable and unnecessary restrictions on the emission of smoke. Fourth, that the courts will not uphold the unreasonable and unnecessary emission of dense, black smoke constituting a public nuisance.—*J. E. Coit.*

887. Anonymous. **The coco-nut industry in Malaya and its future prospects.** Tropical Life 15: 103. 1919.—A compilation showing that Malaya had in 1917, 200,000 to 225,000 acres devoted to coconuts. The erection of modern oil mills is advised so that the product can be marketed as oil rather than copra. The wonderful increase in oil export in the Philippines after 1912 when modern mills were brought in there is noted. In 1912 the Philippines exported 169,000 metric tons of copra and almost no oil; in 1913 the export of coco-nut oil was 1300 tons, and in 1918 over 100,000 tons with a value of about $30,000,000.—*H. N. Vinall.*

888. Anonymous. **Delphiniums.** Missouri Bot. Gard. Bull. 7: 57–59. 1919.—Cultural methods are described and twenty-four species are tabulated with the color, time of bloom, height, habit, and habitat of each.—*O. T. Wilson.*

889. Anonymous. **Flowering palms.** Missouri Bot. Gard. Bull. 7: 46–48. *Pl. 14–15.* 1919.—Palms usually flower and fruit only in their native habitats. A number of species are listed which have been induced to fruit in the St. Louis conservatories.—*O. T. Wilson.*

890. Anonymous. **Killing weeds with live steam.** Sci. Amer. 120^{23}: 599, 613–614. 1919.

891. Anonymous. **Shasta strawberry vines.** Sci. Amer. 121^{10}: 223. 1919.—Records the marketing, on a large scale, of strawberry plants.—*Chas. H. Otis.*

892. Anonymous. **The fruit-growers' sleight of hand. Some of the things that are accomplished by skillful grafting and related processes.** Sci. Amer. Supplem. 88^{2271}: 28–29. *7 fig.* 1919.

893. Anstead, Rudolph D. **Improvement of coffee by seed selection and hybridization.** Agric. Jour. India 14: 639–644. 1919.—An address delivered at the coffee planters conference held at Mysore in July, 1918.—*J. J. Skinner.*

894. Anstead, Rudolph D. **The coffee planting industry in Southern India.** Agric. Jour. India 14: 578–585. 1919.—At the present time there are 223,095 acres in South India devoted to the production of coffee. The coffee-growing areas are Mysore and Coorg which contain 74 per cent of the total. A general discussion of coffee growing is given. Lime and phosphate fertilizers have been used and give good returns. Leaf disease (*Hemileix vastatrix*), (*Corticium Koleroga*) are described, and remedies suggested. The majority of coffee grown in South India is of *arabica* variety. Recently some *robusta* coffee has been planted, which is favored for poor soils.—*J. J. Skinner.*

895. Arnold, Julson. **Chinese products of interest to nurserymen.** Nation. Nurseryman 27: 20–21. 1919.—Products of China's dietary as well as other plant products are dis-

cussed.—In 1917 China exported 200 tons of dried edible mushrooms. They are grown in the mountainous districts on hardwood logs felled for the purpose. Incisions are made in the logs, liquid manure is poured over them, and when this is rotted the fungi spring forth.—Narcissus bulbs are produced in abundance near Amoy, three millions being shipped annually, one third of which go abroad.—In the Southern Provinces of China many varieties of oranges are grown, 6000 tons of this fruit being annually exported. It is stated that 80 different varieties of oranges are produced in China.—Jujubes and persimmons are grown in abundance, 3000 tons being exported annually.—Gall nuts which are produced by insects on certain native trees are used to dye silks black, in tanning, and as medicine. Exports of these gallnuts amount to 1 million taels annually, 75 per cent going to the United States.—Ginger (*Zinziber officinale*) is grown extensively in several Provinces. China exports 5000 tons of it annually.—Camphor (*Cinnamonum Camphora*) is obtained from the camphor tree by destructive distillation. There has been no systematic replanting of these trees and as a result the supplies from Fukien, the chief source of camphor, have been nearly exhausted.—Cassia bark and oil are obtained from *Cinnamomum cassia*, a large tree found in southern China. Methods of obtaining these products are discussed.—Castor beans are found generally throughout China and she has furnished considerable quantities during the war for use as a lubricant for motors.—*J. H. Gourley.*

896. Balme, Juan. **Notas sobre frutales en Mexico. [Notes on fruit trees in Mexico.]** Revista Agric. [Mexico] 4: 224–226. *2 fig.* 1919.—Named varieties of apples developed in Mexico and general notes on Mexican fruit growing possibilities.—*John A. Stevenson.*

897. Balme, Juan. **El higo de esmirna. [The Smyrna fig.]** Revista Agric. [Mexico] 4: 317–319. *2 fig.* 1919.—Popular account of fig growing and its possibilities in Mexico.—*John A. Stevenson.*

898. Batchelor, L. D., and H. S. Reed. **Winter injury or die-back of the walnut.**—California Agric. Exp. Sta. Circ. 216: 1–20. 1919.—Different types of the die-back are described and illustrated. Data and observations are given, showing the relation of die-back to at least four causes, early autumn frosts, winter drought, high water table and alkali soil. Experiments showing how a more adequate irrigation corrected the trouble when due to winter drought, are described.—*H. S. Fawcett.*

899. Blake, S. F. **The anay, a new edible-fruited relative of the avocado.** Jour. Washington [D. C.] Acad. Sci. 9: 457–462. *Fig. 1.* 1919.—See Bot. Absts. 4, Entry 1697.

900. Brierly, W. G. **The effects of fall and winter pruning in Minnesota.** Rept. Iowa State Hortic. Soc. 53: 109–115. 1918.—A brief discussion on pruning in Minnesota. The author states it has made no great difference whether trees were pruned in November or June. Winter pruning has produced no injury.—*L. H. Pammel.*

901. Brooks, Charles, J. S. Cooley, and D. F. Fisher. **Nature and control of apple scald.** Jour. Agric. Res. 18: 211–240. 1919.—See Bot. Absts. 4, Entry 1617.

902. Campbell, J. A. **The fruit industry of British Columbia.** New Zealand Jour. Agric. 18: 361–364. 1919.—Mr. Campbell is investigating the fruit industry of the United States and Canada. Only apple orchards are considered in this report and the subjects covered are the trees-stock, pruning, etc.; pests and diseases-spraying compounds; the Okanagan Valley; marketing and cooperation—the Okanagan United Growers. Many of the orchard practices are found to be quite different from those of New Zealand.—*N. J. Giddings.*

903. Campbell, J. H., and W. H. Taylor. **Orchard establishment and the formation of young fruit trees.** New Zealand Jour. Agric. 19: 1–15. *Fig. 1–8.* 1919.—The ideal aspect for an orchard site in New Zealand is a valley having a gentle northerly slope with a barrier of hills cutting off the southerly winds. The open end of the valley can be easily provided with tall sheltering trees. An orchard should, however, be fully exposed to the sun.—A wide

range of soil may be used but pipe clay within a foot of the surface is to be avoided as under such conditions powdery mildew is a permanent and persistant pest. Drainage is essential where the soil is water logged.—Apple and pear trees may be dipped in a red oil solution and stone fruit in lime sulphur, each of 1 to 10 strengths. On rich land 20 feet is about the best distance apart.—The young trees are pruned to restore the balance of top and root, and to lay the foundation of the future tree. Three or four branches form the head of the tree, the lowest one 10 to 12 inches from the ground. They should not be opposite each other and should be cut back so the total height of the tree is about 18 inches. Summer pruning should be practiced to select the permanent branches and keep them within bounds so they may not be broken by the wind. The second season the main branches are cut back to about 8 inches. In the summer strong growths within the tree are removed and if the leaders bend over they are shortened.—*J. K. Shaw.*

904. Cañedo, Jenaro. **La vid.** [The vine.] Jalisco Rural [Mexico] 1: 225–228, 236–238; 2: 24–26. 1919.—A popular account of the cultivation and propagation of the grape.—*John A. Stevenson.*

905. Cavanaugh, J. R. **Packing and grading.** Trans. Indiana Hortic. Soc. 1918: 177–184. *1 pl.* 1919.—The benefits to be derived from grading are presented along with a discussion of the grades suggested by the Bureau of Markets.—*F. P. Cullinan.*

906. Chandler, W. H. **Pollination.** Trans. Indiana Hortic. Soc. 1918: 111–120, 173–175. 1919.—Cool weather at blooming time caused losses in New York in 1915, 1916 and 1917 because of imperfect pollination. Generally fruit will not grow except through the stimulus of a developing seed. Some varieties are self-fertile, others are self-sterile. This point has been determined for only a few varieties. Bagging the blossoms is one method of testing a variety. Waite's work on pear varieties is reviewed, in which he proved the Bartlett pear self-sterile and the Seckel self-fertile. Peaches and sour cherries are self-fertile. Sweet cherries and American plums are self-sterile. Among apples, Rome Beauty, York Imperial, and Rhode Island Greening are self-sterile, Newtown, Baldwin, and Grimes are self-fertile. The work of Lewis on other varieties is quoted. The remedy for self-sterility is mixed planting and keeping bees. In case of apple and pear, the condition of the tree may influence the set, since on the weak spurs more seeds are necessary to hold the fruit at the time of the June drop. In the discussion are considered the self-sterility of the Delicious, method of interplanting varieties, the June drop, the effect of pollination on flesh color, and the use of Austrian bees. *Max W. Gardner.*

907. Chandler, W. H. **Pruning—its effect on production.** Trans. Indiana Hortic. Soc. 1918: 137–145, 156–161. 1919.—This article is a discussion of the subject of pruning based on the author's investigations. The effect of pruning is to reduce the total amount of growth. Pruning during the dormant season increases the vigor of growth during the following season of adjacent twigs that are left. The new shoots will be longer and the growth is generally stockier. In spite of this increase in vigor, the effect of pruning is to reduce the total amount of growth. There are fewer growing points left and not only is the new growth insufficient to replace what has been removed, but in actual fact less growth is made than on the unpruned tree. Pruning by removing buds that would open into leaves, reduces the foliage and, hence, the consequent decrease of elaborated food manifests itself in reduced growth. This is shown in an examination of 15 one-year old apple trees in the nursery row which the author states had their leaves removed to a height of about 20 inches above the ground. At the end of the season the weight of the roots was 38 per cent less and that of the tops 40 per cent less than those of the unpruned trees that were no larger at the beginning of the experiment. Pruning markedly reduces the fruitfulness during the early years of the life of the tree. It was found that even the amount of pruning necessary to secure an open head reduced the amount of fruit borne by the young tree. The author points out that in case of old trees, however, pruning may have the effect of increasing fruitfulness. In an old unpruned tree where most of the growth is in the spur, the effect of pruning would be to increase the vigor and

to stimulate new growth on which would be formed new spurs that would be larger and more vigorous. For fruits other than the apple, with the exception of the cherry, which seems to need little pruning, renewal pruning is recommended.—*F. P. Cullinan.*

908. Chandler, W. H. **The effect of cold winter of 1917-18 on the fruit industry.** Trans. Indiana Hortic. Soc. 1918: 91-103. *1 pl.* 1919.—The freezing injury of the winter of 1917-18 was the worst in the history of American apple growing. In apples and pears, the sapwood and sometimes the bark of the spurs were killed, and in all fruits, the twigs were killed. There was much killing of the sapwood in the larger branches. In New York, the Rhode Island Greening variety suffered most injury in the spurs and twigs, the Ben Davis in the sapwood of the branches. The bark was often killed where the wood was not well ripened, especially near the base of the tree, or in the crotches. Crotch injury was common in young pear and apple trees. Some varieties such as Northern Spy and Fameuse show crotch injury where twigs and spurs are not injured. Crotch injury is slower to heal and more serious than killed twigs, spurs, or sapwood on the branches or trunk. Often in pears, and apples also, the bark is killed and the cambium remains alive.—The peach is most susceptible to freezing injury and while twigs, small and large branches, and trunk are all equally liable to injury, the peach tree shows remarkable ability to recover. No peach buds survived the winter. Recovery is facilitated by the addition of two to four pounds of nitrate of soda to the soil. Old trees are more liable to die than young trees, and trees that bore a heavy crop in 1917 showed less ability to recover. In New York, apricots proved more hardy than peaches, the wood being largely uninjured and many buds surviving. Sweet cherries did not appear to be as seriously injured as peaches but did not exhiblit the ability to recover and by fall were in as bad condition as peach trees in some sections.—25°F. kills cherry buds. Quince trees suffered from the killing of portions of the 1917 twigs. Few pear trees were killed entirely and while considerable injury to spurs, twigs, trunk, and crotches was suffered, pear trees showed marked ability to recover. Tender and hardy varieties are listed.—In New York, the most tender apple varieties were the Baldwin, Tompkins King, and Rhode Island Greening. McIntosh and Oldenburg were most resistant. The short summer of 1917 prevented wood from going into the winter in a well ripened condition. Premature defoliation, severe pruning, and a heavy yield predisposed to winter injury. Nitrate of soda is preferable to manure as a fertilizer as it is more quickly available and less prolonged in its effect, thus causing an early foliage development and early maturity of the wood. Weak trees of bearing age, especially among pears, are apt to start a very undesirable late season cambial growth. As to treatment, dead branches may be pruned at any time, but weakened branches should be left until after the following summer's growth.—In the subsequent discussion, the point is made that in the freezing the water comes out of the cells and forms ice around them. Killing does not take place until ice formation occurs. The question of cultivation of injured peach orchards and of varietal susceptibility among peaches is also discussed.—*Max W. Gardner.*

909. Chevalier, A. **Le Coffea excelsa et sa culture. [Coffea excelsa and its culture.]** Bull. Agric. Inst. Sci. Saigon 1: 13-19. 1919.

910. Chevalier, A. **Les cultures frutières en Indochine. [Fruits cultivated in Indo-China.]** Bull. Agric. Inst. Sci. Saigon 1: 97-111. 1919.

911. Chevalier, A. **Le pommier à cidre des hauts plateaux de l'Indochine. [The cider apple of the high plateaus of Indo-china.]** Bull. Agric. Inst.Sci. Saigon 1: 142-150. 1919.

912. Coit, J. E. **Automatic disbudding of citrus.** California Citrograph 5: 37. *Fig. 1.* 1919.—Attention is called to the fact that citrus trees do not produce terminal buds; that upon the cessation of growth of a shoot the growing tip is abscissed; and that the presence of these dead tips in the trees is normal and not a symptom of disease as has been represented by some.—*J. E. Coit.*

913. Cowan, James. **Crop production in the northern sandhills.** Nebraska Agric. Exp. Sta. Bull. 171. *8 p.* 1919.—See Bot. Absts. 4, Entry 52.

914. Crocker, William. **Conditions affecting flower development.** [Rev. of: (1) Klebs, George. **Ueber die Blütenbildung von Sempervivum. (Blossom formation in Sempervivum.)** Festschrift zum Ernst Stahl 128–151. Jena, 1918. (2) Fischer, H. **Zur Frage der Kohlensäure-Ernahrung der Pflanzen.** (Concerning the carbon-dioxide assimilation of the plant.) Gartenflora 65: 232–237. 1916. (3) Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p.* 1918.] Bot. Gaz. 67: 445–446. May, 1919.—See Bot. Absts. 4, Entry 1553.

915. Cruickshank, Robert B. **Orchard fertilization.** Trans. Indiana Hortic. Soc. 1918: 121–137. *1 pl., 3 fig.* 1919.—A discussion is given on the results of experiments on the fertilization of the poorer orchard soils of southern Ohio. Nitrogen in the form of nitrate of soda has shown itself to be the necessary element in the great increase in production and improvement in vigor of the hill orchards of southern Ohio. Potash has been of no value in Ohio as an orchard fertilizer. Phosphorus in the form of acid phosphate, even when used with nitrate of soda, has had no effect either in increased production or in growth of tree. However, it has been valuable as a means of obtaining and maintaining clover in the orchard and in this way has increased the organic matter of the soil. For thin soils such as those worked with in southern Ohio, the author recommends a 5 to 5 combination, 5 pounds each of nitrate of soda and acid phosphate to the tree. The nitrate of soda will promote growth of the tree and production of fruit and will aid in the growth of the grasses. The acid phosphate, while not benefiting the tree, will aid in the growth of the clover. The best results from nitrate of soda were obtained when the material was applied just about the time the blossoms were showing pink.—*F. P. Cullinan.*

916. Cruickshank, R. B. **War time orcharding.** Trans. Indiana Hortic. Soc. 1918: 48–68. 1919.—A discussion of orchard operation with suggestions for economy of time and labor during the war period.—*F. P. Cullinan.*

917. Davis, R. A. **Fruit and fruit products of South Africa, I.—Deciduous fruit.** South African Jour. Indust. 2: 774–783. 1919.

918. Davis, R. A. **Fruit and fruit products of South Africa, II.—Citrus and other non-deciduous fruits, berries and nuts.** South African Jour. Indust. 2: 853–866. 1919.

919. de Castella, F. **Repruning of vines damaged by frost.** Jour. Dept. Agric. Victoria 17: 606–614. *8 fig.* 1919.

920. Esbjerg, Niels. **Forsög med sorter of stikkelsbaer og Solbaer. [Experiments with varieties of gooseberries, currants and black currants.]** Tidsskr. Landbrug. Planteavl 26: 52–79. 1919.—The variety experiments were started in 1909 at the Spangsbjerg Station, Esbjerg, Denmark. Eight plants of each variety were planted in 5 plots and picking commenced in 1911, data until 1917 being presented. Fields were recorded as follows in hektokilogrammes per hectare.—Red-berried gooseberry varieties, picked ripe: Achilles 1237; Sproffens Goliath 1119; London Market 982; Whinhams Industry 724; Crown Bob 675; Non Plus Ultra 492; Victoria 315: Williams 300.—Green-berried gooseberry varieties, picked ripe 1911–14, unripe 1915–17 (shown parenthetically)—Whitesmith 414 (741); Keepsake 317 (649); Gottlieb 214 (595); Green Willow 248 (528); Brougham 133 (447); Profit 249 (365); Favorite 133 (240). Currant varieties—Red Dutch 433; Fay's New Red Prolific 212; Cherry Dutch 187; la Fertile 105. Black currant varieties—Black Naples 313; Bang-up 396; Queen Victoria 275; Ogden's Grape 217.—*Albert A. Hansen.*

921. Fairchild, David. **The palate of civilized man and its influence on agriculture.** Sci. Amer. Supplem. 87: 68–71. *8 fig.* 1919.

922. Folger, J. C. **The commercial apple industry in the United States.** U. S. Dept. Agric. Yearbook 1918: 367–379. *Pl. 2, 3 fig.* 1919.—Apple production is increasing in importance. Apples rank ninth in farm crops. Farm orchards are sharply distinguished from

commercial. The farm orchard is no factor in the commercial industry. Increased production is due to the commercial orchard. The survey shows seven major apple producing regions as follows: New York, New England, the Shenandoah, Cumberland and Piedmont regions, Michigan and Illinois, the Ozark and Missouri River region, the western irrigated region, and the Washington region. There are six or seven minor regions. The future of the apple industry is very promising. Apple production does not respond quickly to the law of supply and demand. Some of the regions are at maximum production and as a result of little planting since 1910, it seems not improbable that a shortage with high prices will result in the near future. Increased population, movement to cities, the cessation of war with the probable extension of foreign markets will all aid the commercial outlook.—*C. J. Shirk.*

923. Gardner, F. **A few observations on what I have noticed in fruit culture during the season of 1918.** Rept. Iowa State Hortic. Soc. 53: 107–109. 1918.—A brief discussion of hybrid apples, plums and growing of strawberries.—*L. H. Pammel.*

924. Ginarte, Benjamín Muñoz. **Consideraciones sobre el cultivo de la Piña en Cuba. III. [Cultivation of the pineapple in Cuba.]** Revist. Agric. Com. y. Trab. 2: 426–430. *Fig. 13–16.* 1919.—This installment treats of the production of new varieties from seed, of insects and diseases which attack them, and of the foods, drinks, and textiles which may be made from the pineapple.—*F. M. Blodgett.*

925. Gram, Michael. **Oversigt over Frugtavlens standpunkt og Udvikling i Landets forskellige Egne. [A report on fruit growing in Denmark.]** Tidsskr. Landbrug. Planteavl 26: 80–185. 1919.—An account is given of the distribution and varieties of fruits such as apples, cherries, plums, pears and small fruits, of the extent of fruit growing in Denmark and of the losses due to diseases, insects, and poor soil conditions.—*J. I. Lauritzen.*

926. Greene, Laurenz. **1917–1918 winter injury to apple trees.** Rept. Iowa State Hortic. Soc. 53: 119–124. *2 pl.* 1918.—The author reports the "injury extending from northeastern part of the United States, south and west to the Ohio and Mississippi River, becoming more severe farther east and north." "The injury was most severe on trees from three or four years of age to those twelve or fifteen years of age. Newly planted orchards of one or two years largely escaped injury. Those twenty or more years of age suffered very much less, although farther east these older trees, under certain conditions, suffered very much more." The paper gave as varieties most injured: Indiana: Baldwin, Stayman, Ben Davis, York Imperial; In New York: Baldwin, King, Rhode Island Greening, and Ben Davis. The Winesap in Indiana was fairly resistant. "In the case of young trees, anything that checked the growth early and ripened the wood reduced the injury. Young trees on poorly drained soil suffered less."—*L. H. Pammel.*

927. Greene, Wesley. **Secretary's report.** Report Iowa State Hortic. Soc. 53: 14–18. 1918.—Summary of horticultural crops for Iowa for the year 1918.—*L. H. Pammel.*

928. Griebel, C., and A. Schäfer. **Zur Zusammensetzung der Inklusen, gleichzeitig ein Beitrag zur Kenntnis der Vorgänge beim Teigigwerden der Früchte. [The composition of "Inclusions" and the process of mellowing of fruits.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 97–111. 1919.—See Bot. Absts. 4, Entry 1454.

929. Guilford, W. H. **The old pear trees of Dubuque county.** Rept. Iowa State Hortic. Soc. 53: 314. 1918.—Notes showing that some of the early French and German settlers planted pears, some of the trees still growing and these trees are seventy years old.—*L. H. Pammel.*

930. Harris, Wm. **The peanut or groundnut.** Jour. Jamaica Agric. Soc. 23: 263–265. 1919.—Description of the plant, cultivation, harvesting, yields, uses, and food value.—*John A. Stevenson.*

931. Hedrick, U. P., and R. D. Anthony. **Twenty years of fertilizers in an apple orchard.** New York Agric. Exp. Sta. [Geneva] Bull. 460: 71-96. *Fig. 1.* 1919.—A report on an experiment conducted in a cultivated orchard on heavy clay loam soil at Geneva, N. Y. The results, as measured by the yield of fruit and tree growth, were, in general, so contradictory and inconclusive that no conclusion of practical value could be drawn.—*F. C. Stewart.*

932. Hume, H. Harold. **Present day nursery problems.** Amer. Nurseryman 33: 146. 1919.—Among other problems confronting this group of horticulturists the writer discusses the practicability of the Quarantine Acts of the Federal Horticultural Board, and favors an effort to grow ornamental and fruit stocks in America.—*J. H. Gourley.*

933. Johnston, Earl S. **An index of hardiness in peach buds.** Amer. Jour. Bot. 6: 373-379. *Fig. 1-2.* 1919.—See Bot. Absts. 4, Entry 1587.

934. Little, James A. **A tribute to the pawpaw.** Trans. Indiana Hortic. Soc. 1918: 312-319. *1 fig.* 1919.—The horticultural characteristics of the tree and fruit are presented. Trees may be grown from seed if shaded for 1 or 2 years and will bear in 6 to 8 years. Grafting is feasible. Fruit is borne every year. Although not suitable for shipment, the fruit is desirable for home use and local market.—*Max W. Gardner.*

935. McClelland, T. B. **Efecto de diferentes metodes de trasplantar café. [Effect of different methods of transplanting coffee.]** Porto Rico Agric. Sta. Bull. 22: 1-12. *1 pl.* Span. ed. 1919. [Eng. ed. 1917.]—Tests were made to demonstrate the advantages and disadvantages of different methods of transplanting coffee seedlings. There were no appreciable differences, in the case of year old seedlings with five to six pairs of leaves, between those taken up with a ball of earth about the roots and those set out bare of earth. When the seedlings were left in the nursery eighteen to twenty months, however, an earlier growth and increased yield resulted in the case of plants set out with a ball of earth over those removed with roots free of soil. The increased growth was found to be from 12 to 43 per cent greater and the yield doubled or tripled at the end of the second year. Recommendations for seed selection, proper methods of pulping and drying the seed, care of nurseries, and a method of transplanting to holes prepared in advance are given.—*John A. Stevenson.*

936. Mercier, C. A. **The electrification of seeds.** Sci. Amer. 120: 142-143. *6 fig.* 1919. —See Bot. Absts. 4, Entry 104.

937. Miéville, R. **Culture des arbres frutiers d'Europe au Laos et au Tonkin. [Cultivation of European fruits in Laos and Tonkin.]** Bull. Agric. Inst. Sci. Saigon 1: 111-116. 1919.

938. Moore, James G. **Some recent facts significant in horticulture.** Rept. Iowa State Hortic. Soc. 53: 66-73. 1918.—The author discusses inspection of fruit, the mutual relationship of fruit growers, and emphasis on horticultural teaching.—*L. H. Pammel.*

939. Oskamp, Joseph. **Planting fruit trees.** Trans. Indiana Hortic. Soc. 1918: 323-328. *3 fig.* 1919.—Directions are given for choice of nursery stock, heeling-in, and planting, with notes on varieties for Indiana.—*F. P. Cullinan.*

940. Patten, Charles G. **Pears where pears do not usually grow.** Rept. Iowa State Hortic. Soc. 53: 299-300. *1 pl.* 1918.—Gives an account of pear trees on the state station grounds at Charles City, among them the Chinese pears and the *Pyrus ussuricusis*.—*L. H. Pammel.*

941. Pearcy, Harry L. **Science aids nature in causing barren trees to bear.** Better Fruit 14[4]: 8. Oct., 1919.—A brief summary of the present status of the pollination question of the sweet cherry in the Northwest. The work of V. R. Gardner of the Oregon Agric. Coll. Exp. Sta. is epecially emphasized.—*A. E. Murneek.*

942. Pennypacker, John Young. **Observations on the beach plum, a study in plant variation.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 231–269. *Pl. 66–70.* 1919.—See Bot. Absts. 4, Entry 701.

943. Pillai, N. Kunjan. **Coconut the wealth of Travancore.** Agric. Jour. India 14: 608–628. 1919.—An account is given of the origin of coconut cultivation and the industry in Travancore. It is stated that the greatest possibilities in the improvement of coconut cultivation in Travacore lie in the method of manuring.—*J. J. Skinner.*

944. Robin, J. **La culture du Cocotier dans l'île de Phu-tuc, Cochinchine. [The cultivation of the coconut palm in Phu-tuc island, Cochinchina.]** Bull. Agric. Inst. Sci. Saigon 1: 201–207. 1919.

945. Scott, W. M., H. C. Hetzel, H. W. Samson, and M. Stockton. **Preparation of barreled apples for market.** U. S. Dept. Agric. Farmers Bull. 1080. *40 p. 24 fig.* 1919.

946. Skvortzow, B. W. **Notes on the agriculture, botany and zoology of China.** Jour. Roy. Asiatic Soc. North-China Branch 50: 49–107. *Pl. 1–2, fig. 1–11.* 1919.—See Bot. Absts. 3, Entry 2462.

947. Stevens, Neil E. **Keeping quality of strawberries in relation to their temperature when picked.** Phytopath. 9: 171–177. 1919.—Observations were made on the keeping quality of strawberries picked early in the morning while still cool and wet with dew as compared to berries picked later in the day when dry and relatively warm. Although most practical growers are prejudiced against picking and shipping wet berries the percentage of sound fruit after three to five days in nearly every case was higher in the fruit picked early in the day.—*G. F. Potter.*

948. Tufts, Warren P. **Pruning young deciduous fruit trees.** California Agric. Exp. Sta. Bull. 313: 113–153. *24 fig.* 1919.—The paper is a preliminary report upon the pruning of young deciduous fruit trees. The objective aimed at is to secure better methods of shaping young trees in order to being them into earlier fruiting and to secure larger trees in a more economical way. The growth of orchard trees has been gauged by the author on trunk circumference measurements, since he has found a correlation to exist between trunk circumference and root and top weights. Experiments devised to decide between light and heavy pruning of young trees favor the light pruning with thinning and no heading back, as a means to obtaining larger and stronger trees with early fruiting. Summer pruning at any time is considered as devitalizing, whereas, midsummer cutting is more weakening than that done during the early part of the season. The low heading of young trees is recommended. Practical suggestions on the shaping of young fruit trees are offered. The methods of pruning and heading-back are amply illustrated.—*A. R. C. Haas.*

949. Von Blon, J. L. **Jack Frost in the orange country.** Sci. Amer. 121^{12}: 278–279. *5 fig.* 1919.—A description is given of the activities of cooperative frost-protective associations and methods of preventing frost damage to orange groves.—*Chas. H. Otis.*

HORTICULTURE PRODUCTS

950. Anonymous. **Vanilla curing in St. Kitts.** Agric. News [Barbados] 18: 275. 1919.—From experiments carried out by K. E. Kelsick, it appears that: (1) Immersion in hot water is necessary in curing vanilla beans, (2) The best aroma is developed in water at 80°C. and this would therefore appear to be the optimum temperature, (3) The beans must next be sweated (a glass-topped box gave good results) at a temperature of 50°C. until they have a boiled appearance and have lost from 30 to 40 per cent of their weight, (4) After sweating they must be dried slowly at room temperature (30°C.) for about two weeks, (5) Best results are obtained by wrapping the cured beans in waxed paper and packing them in air-tight tins as soon as possible after drying, (6) The beans lose from 70 to 80 per cent in weight during the curing process.—*J. S. Dash.*

951. Anonymous. Paste which preserves watermelons. Sci. Amer. 121[12]: 299. 1919.—See Bot. Absts. 4, Entry 1229.

952. Anonymous. Varnished raisins. Sci. Amer. 121[11]: 272. 1919.—A description is given of a new process, in which grapes and raisins are dipped in boiling glucose solution, previous to drying. This prevents the skin from cracking and retains the grape sugar.—*Chas. H. Otis.*

953. Babé, Enrique. El platano o banano como alimento y como industria. [The banana as a food and as a business.] Revist. Agric. Com. y Trab. 2: 424–425. 1919.—The high food value of various varieties of plantains and bananas is shown by analysis. The method of making banana flour is described. The leaves may be used as cattle feed fresh or as silage or may be used as a source of textile fiber.—*F. M. Blodgett.*

954. Bioletti, Frederic T., and A. E. Way. Saving raisins by sulfuring. California Agric. Exp. Sta. Circ. 211: 2. 1919.—An improved method of saving raisins in rainy weather by means of a sulfuring hood to confine the fumes in the stacks, is described and illustrated.—*H. S. Fawcett.*

955. Buttenberg, P. Fruchtaroma und Geschmacksstoffe zur Herstellung von Ersatzlebensmitteln, z. B. Kunstlimonaden, Kunstmarmeladen, Gelees, Liköre usw. [Fruit aromas and flavors in food substitutes, artificial lemonades, marmalades, jellies, liquors, etc.[Zeitschr. Untersuch. Mahrungs-u. Genussmittel 37: 331–344. 1919.

956. Collens, A. E. A new bean dish. Agric. News [Barbados] 18: 387. 1919.—This is a short note on the preparation for table of the Vilmorin's Stringless Bonavist which, in Antigua, is finding favour as a vegetable both in the young and mature stages.—*J. S. Dash.*

957. Crevost, C., and C. Lemarié. Plantes et produits filamenteux et textiles de l'Indochine. [Fiber and textile producing plants of Indochine.] Bull. Econ. Indochine 22: 365–401. *Pl. 1–3, fig. 1. Ibid.* 553–591. *Pl. 1, 2, fig. 1–9.* 1919.—See Bot. Absts. 4, Entry 53.

958. Cruess, W. V. Salvaging rain-damaged prunes. California Agric. Exp. Sta. Circ. 212: 1–12. 1919.—The damage done to prunes by September 1918 rains is described. Exposure of wet prunes to fumes of burning sulfur is recommended, in addition to the usual methods of turning, stacking, etc. The utilization of damaged fruit for hog feed, syrup, etc., is also suggested.—*H. S. Fawcett.*

959. Dearing, Charles. Unfermented grape juice: How to make it in the home. U. S. Dept. Agric. Farmers Bull. 1075. *32 p. 20 fig.* 1919.

960. Flockton, B. P. The production and refining of edible oils. Tropical Life 15: 106-112. 1919.—A very complete description is given of the machinery and processes used in the manufacture of the edible oils.—*H. N. Vinall.*

961. Härtel, F. Zur Bestimmung von Stärkesirup in Marmeladen nach dem Verfahren von Juckenack. [Determination of starch syrup in marmalades.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel. 37: 65–81. 1919.

962. Holland, J. H. Food and fodder plants. Kew Bull. Misc. Inf. [London] 1919: 1–84. 1919.—See Bot. Absts. 4, Entry 78.

963. Knapp, A. W. Science in cacao production. Sci. Amer. Supplem. 87: 165. 1919.

964. Krug, Otto, and Hans Filchner. Die Weinernte 1918 in der Pfalz. [The 1918 vintage in the Palatinate.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 111–115. 1919.

965. Kryz, Ferdinand. **Beitrag zur Kenntnis der Reaktionen der Farbstoffe der Hagebutten, Hollunderbeeren und verwandter Beeren. [Reactions of the coloring matters of hips, elderberries, and related berries.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel **37**: 125–127. 1919.—These colors are subject to imitation in marmalades, etc.; identification tests are therefore offered.—*H. G. Barbour.*

966. Prescott, S. C. **Dried vegetables for army use.** Amer. Jour. Physiol. **49**: 573–577. 1919.—Dehydrated vegetables were used in fairly large quantities by the American forces, especially potatoes and soup mixtures, in all about 40,000 tons. Further work is being done to procure better quality. The chief advantages in their use are that they lower cost, occupy less storage and transportation space, keep indefinitely and give better health by a wider range of food in the ration.—*Ernest Shaw Reynolds.*

967. Schmitt, Richard. **Untersuchung von 1918-er Traubenmosten Frankens. [Grape musts of Franconia.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **37**: 177–183. 1919.

968. Ventre, J. **Les sarments ensilés apres vendange source d'alcool et d-acide tartrique. [Grape vine ensilage as a source of alcohol and tartaric acid.]** Compt. Rend. Acad. Agric. France **5**: 334–340. 1919.—The paper in full, of which a review by Lindet was given in Botanical Abstracts 3, Entry 1072.—*E. A. Bessey.*

VEGETABLE CULTURE

969. Anonymous. **Future of vegetable seed growing in the United States.** Seed World 5^4: 353. 1919.

970. Calvino, Mario. **Informe del director. [Report of the director.]** Informe An. Estac. Exp. Agron. [Cuba] **1917–1918**: 1–439. *180 fig.* 1919.—Varieties of potatoes, sweet potatoes, Jerusalem artichoke, and other root crops were grown successfully and further comparative trials planned. Among the vegetable crops tomatoes, eggplant, peppers, lettuce, chayote, Chinese mustard, sesamum, and a number of cucurbits were tested and for the most part successfully. The Klondyke, Missionary, Aroma and Gibson were among the best strawberry varieties grown. New and promising varieties of mangos and avocados were found and are being propagated for future distribution. Other fruit and nut trees are under observation, such as *Citrus* in many varieties, papaya (*Carica papaya*), grapes, the native walnut (*Juglans insularis*), pecan, and Queensland nut (*Macadamia ternifolia*), Japanese chestnut (*Castanea crenata*) and a relative of the papaya [*Jacaratia mexicana*). *Salvia hispanica* was grown during the winter months. [See Bot. Absts. 3, Entry 2586; 4, Entry 45.]—*John A. Stevenson.*

971. Higgins, J. Edgar. **Report of the horticultural division.** Hawaii Agric. Exp. Sta. Rept. **1918**: 7, 8, 13–21. *Pl. 2, 3.* 1919.—Investigations were conducted with 13 varieties of string beans for canning purposes. In the tomato breeding work, the Earliana, a standard variety, was crossed with the small wild form and also with some of the "plum" and "pear" varieties resistant to the melon fly (*Dacus cucurbitae*), the crosses resulting in an intermediate form highly resistant to the melon fly. Several new pineapple seedlings of the Smooth Cayenne and of hybrids of Queen X Smooth Cayenne are under observation and test.—*J. M. Westgate.*

972. Kinman, C. F., and McClelland, T. B. **Experimentos sobre el supuesto deterioro de diferentes legumbres en Puerto Rico, con indicaciones para la preservacion de la semilla. [Experiments on the supposed deterioration of vegetables in Porto Rico, with suggestions for seed preservation.]** Porto Rico Agric. Exp. Sta. Bull. **20**: 1–32. *8 fig.* Span. ed. 1919. [Eng. ed. 1916.]—Experiments with a number of common vegetables were made in order to test out the common belief that northern vegetables degenerate when grown in the Tropics. It was found that this was due to loss of viability when the seed was exposed to the moist air and

to growing at the wrong season. Seed stored in air-tight jars in the bottom of which calcium chloride had been placed maintained their viability. Plantings of peppers, beans, okra, tomatoes and lettuce made over a period of five years and during all seasons failed to indicate any degeneration of native seed as compared with northern grown seed when properly cared for. "In all vegetable plantings the season at which the planting was made had a very pronounced effect on the yield, being the predominant factor influencing production."—*John A. Stevenson.*

973. Sanchez, A. **El chayote. [The chayote.]** Bol. Camara Agric. Nacion. Leon [Mexico] 6: 335–339. 1919.—A popular account of the culture of the chayote (*Sechium edule*) as practised in Mexico.—*John A. Stevenson.*

974. Varela, E. **El frijol dolico. [The Dolichos bean.]** Revista Agric. [Mexico] 4: 18–20. *2 fig.* 1919.—See Bot. Absts. 4, Entry 138.

975. Wheeler, W. A., and G. C. Edler. **Some effects of war upon the seed industry of the United States.** U. S. Dept. Agric. Yearbook 1918: 195–215. 1919.—The seed industry was affected materially by the war. Rapid strides were made but many of the effects are probably only temporary. Imports of seeds decreased greatly and exports increased as shown by statistics. The rise of the small gardener produced a great domestic demand. Maps were given showing the location of the principal seed producing areas in the United States. Due to the demand, quantity rather than quality prevailed, novelties were minimized, standard varieties emphasized. The seed industry was adversely affected by transportation facilities, local problems, and banking conditions. The bureau of markets established a seed reporting service to stabilize conditions. The difficulties appear not insurmountable.—*C. J. Shirk.*

976. Youngken, Heber W. **Notes on the dasheen and chayote.** Amer. Jour. Bot. 6: 380–386. *Fig. 1–5.* 1919.—Two exotic vegetables recently introduced into the United States, the Trinidad dasheen (a variety of *Colocasia esculenta* (L.) Schott) and the chayote (*Chayota edulis* Jacq.) are described in detail as to history, external characters of the plant histology of the fruit, and economic value and uses The corms of the dasheen are employed in the same way as white potatoes, the aerial shoots as asparagus and the fruits of the chayote as squash. [See Bot. Absts. 3, Entry 2792.]—*E. W. Sinnott.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

977. Anonymous. **Honey. Newest theories concerning the function of the nectary in flowers.** Sci. Amer. Supplem. 88: 22–23. 1919. [Translation of extracts of an exhaustive article by M. Gaston Bonnier in *La Revue Hebdomadaire* (Paris).]

978. Anonymous. (A. H. C.) [Rev. of: Bower, F. O., J. G. Kerr, and W. E. Agar. **Lectures on sex and heredity delivered in Glasgow, 1917–18.** *16mo. vi + 119 p.*] Macmillan Co.: London, 1919. Jour. Botany 57: 287–288. 1919.

979. Artschwager, Ernst F. **A new fixative for paraffin sections.** [Rev. of: Szombathy, Koloman. **Neue Methode zum Aufkleben von Paraffinschnitten. (New methods for the mounting of paraffin sections.)** Zeitschr. Wiss. Mikrosk. 34: 334–336. 1918.] Bot. Gaz. 67: 373–374. 1919.—The reviewer has tested this method and finds it to be excellent. Material difficult to retain on the slide, such as moss archegonia and sections of grass leaves, adhered to the slides even when left in running water for several days. The new fixative is easily prepared, keeps well, and should come into general use.—*H. C. Cowles.*

980. Bailey, Irving W. **Structure, development, and distribution of so-called rim or bars of Sanio.** Bot. Gaz. 67: 449–468. *3 pl.* June, 1918.—Bandlike thickenings of the middle lamella and scalariform primary pit areas are characteristic of tracheids which have scalariform bordered pits, and are widely distributed among pteridophytes, gymnosperms and angiosperms. The middle lamella frequently retains its typical scalariform structure after the secondary wall has lost it. In the gymnosperms, as well as in the pteridophytes and angiosperms, there appear to be transitions between primary membranes of this type and others in which the scalariform structure is profoundly modified. There is much evidence suggesting that the types of unconformity and peculiar bandlike thickenings of the middle lamella are concomitants of processes of modification or reduction in tracheary pitting.—*I. W. Bailey.*

981. Baumgärtel, Otto. **Studien über Pneumatocarpien. [Studies on inflated fruits.]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 13–40. *Pl. 1, fig. 1–4.* 1917.—See Bot. Absts. 4, Entry 1526.

982. Baumgärtel, Otto. **Die Anatomie der Gattung Arthrocnemum Moqǔ. [The anatomy of the genus Arthrocnemum Moqǔ.]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Naturw. Kl. 126: 41–74. *Fig. 1–14.* 1917.—An anatomical study was made of *Arthrocnemum*, a genus of the Chenopodiaceae near *Salicornia*, to determine whether these two genera possess any anatomical variations of a fundamental nature which might serve as generic characters. Preserved and dried materials were used. Studies were made of sections from tips of mature and developing roots, shoots, and seedlings. Cultures were grown in order to determine the effect of external conditions upon the anatomical and morphological characteristics. Details of the anatomical findings are given. The author concludes that because of the ease with which these species adapt themselves to changes in environment these succulent Salicorniae must be a relatively recent group and not relics of older Chenopodiaceae as Volker has suggested. —*W. C. Muenscher.*

983. Beck, V. Mannagetta, and G. Lerchenau. **Wacholderbeeren mit entblöszten Samen. [Juniper berries with exposed seeds.]** Sitsungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 403–419. *Fig. 1–31.* 1917.—In a study of living and herbarium specimens of a large number of species, it was found that some individuals of most species of *Juniperus* produce some fruits with exposed seeds. Exposed seeds rarely occur in normal fruits. The cause for exposed sseeds seems to be unequal growth in the seeds and enveloping fleshy scales, resulting in the piercing of the fleshy scales by the seeds in the *Sabina* section; or in the failure of the scales to grow completely over the seeds or in breaking apart of the scales in the *Oxycedrus* section. The authors give a review of the literature relating to this subject.—*W. C. Muenscher.*

984. Chrysler, M. A. **The living cycads.** [Rev. of: Chamberlain, C. J. **The living cycads.** Univ. Chicago Sci. Ser. *172 p., 91 fig.* Univ. Chicago Press: Chicago, 1919 (See Bot. Absts. 2, Entry 751; 3, Entry 142).] Bot. Gaz. 67: 512–513. 1919.—The reviewer states that this book is written by the one best fitted for the task. The content is highly commended, particular satisfaction being expressed with the graphic style and the photographic illustrations.—*H. C. Cowles.*

985. Coulter, J. M. **Apogamy in Nephrodium.** [Rev. of: Steil, W. N. **A study of apogamy in Nephrodium hirtipes.** Ann. Botany 33: 109–132. *3 pl.* 1919. (See Bot. Absts. 2, Entry 738.)] Bot. Gaz. 67: 519. 1919.

986. Feenstra-Sluiter, C. **Waarnemingen en Beschouwingen over Bloei, Bevruchting en Zaadvorming bij Cinchona Ledgeriana Moens. [Observations and considerations concerning flower, frutification, and seed formation in Cinchona ledgeriana Moens.]** Mededeel. Kina Proefstat. Dept. Landb., Nijverheid en Handel. [Tjinjiroean, Java] 6: 1–35. *4 pl., fig. 1–20.* 1919.—The present study was undertaken as a basis for selection and breeding work on *Cinchona.* The detailed morphology of the dimorphic flowers, their pollination and fertilization

are described and illustrated. Cross pollination was found to occur commonly through the aid of insects. It appears that this species may be either self-sterile or self-fertile though in one case seed from such fertilizations furnished weak plants. As a result of his morphological and pollination studies the writer concludes that improvement can best be attained by combining desirable characters through crossing. Since it would require too long a time to obtain pure lines with *Cinchona* the following procedure is suggested: Select two parents which are fertile when crossed, which produce a maximum amount of seed and whose hybrids combine the desired qualities. Having once found two such plants they should be multiplied sufficiently by suckering to plant a seed-garden. The free crossing between the two types should then guarantee a yearly yield of superior seed.—*R. D. Rands.*

987. Findeis, Marie. **Über das wachstum des Embryos im ausgesäeten Samen vor der Keimung. [On the growth of the embryos in sown seeds before germination.]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat.Kl.) 126: 77–102. *2 pl.* 1917.—In a study of the seeds of ten species of flowering plants, the author finds the embryo to be larger or more fully developed at the time of germination, i.e., the exit of the radical from the seed, than at the time the ripe seed spontaneously separates from the mother plant. This is due to the growth of the embryo in the apparently ripe seed after it is planted. The time necessary for this growth varied from 8 days to 10 months in the species studied and is hastened or delayed by various factors. In certain seeds the absorption of water is necessary while in others darkness, frost, etc., are prerequisite for this embryonal growth. In all the plants discussed the growth of the embryo within the seed after planting is a process which regularly precedes the beginning of germination. However, germination does not necessarily immediately follow the completion of embryonal growth. The author concludes that this embryonal growth process in conjunction with certain other factors, is the cause for the delay in germination of ripe seeds after planting.—*V. C. Dunlap.*

988. Mondino, Alfonsino. **Ricerche anatomiche e morphologiche sulla var. "tuberosa" Asch. dell "Arrhenatherum elatius" M.K. nuovamente trovata in Piemonte. [Anatomical and morphological research on var. tuberosa Asch. of Arrhenatherum elatius M.K. recently found in Piedmont.]** Atti. R. Accad. Sci. Torino 54: 782–794. 1919.—The above grain is found widely distributed in Italy, and is distinguished by the tuberosity of the internodes of the rhizome. A comparative study of the caulis, rhizome and tuberous swellings shows variations which adapt the organs to special functions. In the normal caulis the internodes are empty, but the section of the tuberous internode shows that in the tuberosity the parenchyma, which acts as a storehouse of reserve material, undergoes a preponderating development, excluding the medullary cavity. The vascular bundles, reduced in number and simplified in structure, are arranged in linear series, with the parenchyma disposed in rays so that they appear like stars, contrasting with the regularity of this tissue in the normal caulis. The tissue of the node is composed of thickened parenchyma, containing vascular bundles scattered regularly as in the normal stem. In the tuberous caulis the cuticle is notably increased for protection, and mechanical tissue is entirely reduced. The material stored up in the tuberosity is a carbohydrate, graminin, $C_{48}H_{80}O_{40}$, related to inulin. It is found dissolved in the liquid of the leucoplastids, and crystallizes in sphaerocrystals. Through hydrolysis it gives rise to laevulose. Its specific weight is 1.5222. It turns polarized light to the left, and fuses at 209°. In mass it is a light cream powder like farina, and it is insoluble in alcohol. It may prove of dietetic importance.—*Harriet M. Libby.*

989. Smith, J. J. **Nieuwe misvormingen bij klappers. [New anomalies in cocoanuts.]** Teysmannia 30: 291–297. *Pl. 1–4.* 1919.—The paper contains descriptions and figures of anomalies observed in the cocoanut tree.—*Transformation of inflorescences into branches.* In all the leaf axils there are found branches densely covered with small linear and partly pinnate leaves, only a small inflorescence remaining at the top.—*Increase in the number of female flowers.* In some trees the inflorescences show the normal form; nearly all the female flowers produce fruit, which, however, remains very small; many of the fruits with a length of at most 11 cm., germinate normally. In other trees the inflorescences are simple, or bear only one,

or very few branches; a relatively small number of female flowers produce fruit, which attain nearly the normal size.—*Proliferation.* The female flowers of an inflorescence show foliar proliferation; the male flowers seem to have been abnormal leaving only a few fragments on the spadix.—*Fruit without seed.* The fruit has an ellipsoidal form, but is of the ordinary length.—*Fruit with two cells.* Each cell has a normal seed.—*Polyembryony.* Occasionally cocoanuts produce three or even four stems. It seems that in most of these cases the fruit is one-celled and contains one seed. As only one of the germinating holes is pierced and the young plants are wholly free from each other the phenomenon is to be ascribed to a form of polyembryony.—*J. J. Smith.*

990. STEIL, W. N. **Apospory in Pteris sulcata.** Bot. Gaz. 67: 469–482. *4 fig. 2 pl.* June, 1919.—The embryo sporophyte of *Pteris sulcata* is of apogamous origin. The gametophyte generation is ordinarily produced by the germination of a spore, but under certain conditions was produced aposporously. Such gametophytes or gametophytic portions were formed in connection with the lamina or the petiole of the primary leaf. In one instance a prothallium was produced from both lamina and petiole. A sharp line of demarcation usually exists between the cells of the gametophyte and the sporophyte. The prothallial portions developed antheridia, secondary prothallia, and in one instance a sporophyte-like outgrowth. The antherozoids, produced by the aposporously developed prothallia, were actively motile and normal in appearance. Occasionally forms intermediate in character between gametophyte and sporophyte were formed. It is probable that the origin of the aposporously produced gametophyte may be traced to an early stage in the development of the embryo. Since the embryo, on account of its apogamous origin, is intimately connected with the prothallium, it is possible that cells of the prothallium may be embodied in the developing embryo. These cells, retaining the power to divide, may produce such outgrowths as have been described.—*W. N. Steil.*

991. STEVENS, NEIL E. **The development of the endosperm in Vaccinium corymbosum.** Bull. Torrey Bot. Club 46: 465–468. *Fig. 1–4.* 1919.—In *Vaccinium corymbosum* the development of the endosperm may begin by a cross wall, following the first division of the primary endosperm nucleus, as is the case for many other Ericaceae; or by a period of free nuclear division. This one species, therefore, exhibits methods hitherto associated with different groups.—*P. A. Munz.*

992. WATKINS, J. R. **Pitch pockets and their relation to the inspection of airplane parts.** Jour. Franklin Inst. 188: 245–263. *Fig. 1–3.* 1919.—See Bot. Absts. 4, Entry 480.

993. ARBER, AGNES. **Studies on intrafascicular cambium in monocotyledons (III. and IV).** Ann. Botany 33: 459–465. *Fig. 1–7.* 1919.—The occurrence of a cambium is recorded for the first time in members of the Juncaceae, Haemadoraceae, Amaryllidaceae, and Cyclanthaceae. A cambium has now been seen in nineteen families and in ten out of eleven cohorts of monocotyledons. In the eleventh cohort (Triuridales) cases are here described of an arrangement of the elements which may be interpreted as indicating cambial activity.—The structure of the leaf bundles of *Veratrum album* is described in some detail. In this species the cambium which is well developed appears in the summer, persists through the winter and functions in the succeeding year. There is a clear differentiation between the secondary xylem and the primary metaxylem, a condition which has been observed in a number of other monocotyledons. The xylem of the laterial veins is attached to the secondary xylem of the bundles from which they arise.—*W. P. Thompson.*

994. BAILEY, I. W. **Depressed segments of oak stems.** Bot. Gaz. 67: 438–441. *4 fig.* 1919.—This paper is essentially a defense of the author's views against certain criticisms made in a recent paper by LANGDON (See Bot. Absts. 1, Entries 581, 1154). That the deeply depressed segments of young oak stems are correlated with the presence of pairs of approximated multiseriate rays rather than the stellate arrangement of the primary elements is indicated not only by a comparative study of the stems of various arborescent dicotyledons, but also by numerous facts in the anatomy of the genus *Quercus.* Exception is taken also to LANG-

don's supposition of growth acceleration as a physiological explanation for the stellate form of the stele in young twigs.—*H. C. Cowles.*

995. Denis, M. **Recherches anatomiques sur quelques plantes littorales de Madagascar. [Anatomical studies of some shore plants of Madagascar.]** Rev. Gén. Bot. 31: 35–52, 115–120, 129–142. *Pl. 1, fig. 1–12.* 1919.—A detailed study of the ecological anatomy of a number of plants of the seashore sands of the eastern coast of Madagascar. The climate is distinctly tropical, with abundant sunshine, with a high, nearly constant temperature, moderate rainfall, and constant high, dry winds; the soil is a dry, loose sand. Under these conditions the majority of plants are characterized by an almost complete lack of special epidermal protection, by a fleshiness of leaf and sometimes of stem (which is, however variable), by a general bifacial structure, and by well-developed water storage tissue. In these features, which are practically typical halophytic modifications, these Madagascar plants approach the halophytes of temperate regions.—*A. J. Eames.*

996. Evans, Arthur T. **Embryo sac and embryo of Pentstemon secundiflorus.** Bot. Gaz. 67: 427–437. *1 pl.* 1919.—The embryo sac is developed from a single megaspore, the antipodals disorganizing early. The micropylar end becomes bulbous, the chalazal end long, narrow, and covered by a distinct tapetum. The mature embryo sac is constantly gorged with starch, due to the non-utilization of the nutritive materials which pass into the sac at a time of inactivity just before fertilization. The endosperm nucleus immediately divides and free nuclei migrate into the chalazal end of the sac, where wall formation begins. The proembryo is pushed into this endosperm by an extreme growth of the suspensor. The micropylar end of the sac disintegrates. Two haustoria are formed, the micropylar by the growth of endosperm cells from the chalazal end into the micropylar end, and the chalazal by the growth of endosperm cells from the chalazal end out into the vascular system. The cells of the latter haustorium are binucleate. False embryony occurs rather commonly.—*Arthur T. Evans.*

997. Gatin, Valentine-Charles. **Recherches anatomiques sur les variations du Paris quadrifolia L. [Anatomical studies of Paris quadrifolia L. and its variations.]** Rev. Gén. Bot. 31: 329–349, 353–371. *Fig. 1–21.* 1919.—The anatomy of the aerial stem, peduncle, and flower of normal and abnormal forms is described, attention being given particularly to the origin and course of the vascular bundles. The type with four leaves and a 4-merous flower is considered normal. In this the essential structure is as follows: In the stem three series of bundles persist without change from their points of origin at or near the rhizome to the whorl of leaves; the outer two series supply the leaves and form an outermost series in the peduncle. The innermost, or medullary, group becomes at the level of the leaves two concentric series which pass directly into the puduncle so that the structure of the latter is similar to that of the stem. Of the three series in the peduncle, the outermost is the sepal supply, the median, the petal supply, and the innermost that of the stamens and carpels. In number and arrangement of bundles the floral axis of *Paris* is thus different from that of the majority of the Liliaceae. Further, the vascular supply of the sepals, being derived from bundles distinctly foliar in nature, has an origin quite different from that of the petals, which have a cauline supply; and the supply of the stamens is derived independently of that of the petals, whereas the vascular supply of these two sets of organs often arises in common in the dicotyledons. From a comparison of forms with abnormal numbers of leaves and of floral parts with typical plants, it is found that the anatomical structure varies directly with external modifications. The 3-merous forms approximate *Trillium* in structure, the 5- and 6-merous, the Asiatic species of *Paris*. The author believes that there is evidence in this comparative study that a trimerous type has been transformed into a tetramerous, and then into pentamerous and hexamerous types; that this process is now going on; and that the tendency toward this change is spreading from the west to the east in the northern hemisphere.—*A. J. Eames.*

998. Hardy, A. D. **Teratological note. Pentamery in a flower of Narcissus.** Proc. Roy. Soc. Victoria 31 (N. S.), Part I: 7–8. 1918. [Received 1919.]—In *Narcissus tazetta* one bloom among many thousands examined simulated a dicotyledonous bloom. The normal floral

formula is K3:C3:A3+3:G3. Instead of showing arithmetical doubling the specimen discussed had the formula K5:C5:A5+5:G5. The size of the floral parts was normal but their numerical increase resulted in a conspicuously larger flower. The inter-antheral spaces were almost obliterated so that insect access would be difficult although cross pollination was possible. Only one previous record of an occurrence somewhat similar could be found although both irregular and rhythmic polyphylly have been recorded for *Narcissus*. Work of others on this subject is cited.—*Eloise Gerry.*

999. Lingelsheim, Alexander. **Über das Auftreten von Palisadenparenchym an der Unterseite bifacialer Blätter. [On the appearance of palisade tissue on the under side of bifacial leaves.]** Ber. Deutsch. Bot. Ges. 36: 485–491. 1919.—Although very few instances of hypertrophy of the leaf lamina are on record, recent investigations show that they are found very frequently on leaves of *Corylus*, *Alnus*, and *Fagus*, especially in trees with the lacerate type of leaf structure. The abnormal leaf thickening is found near the margin and in the primary intercostal fields of the lamina, advancing in a wedge-like manner toward the midrib. In *Corylus Avellana* and *C. laciniata* this anomaly is a very common occurrence. Anatomically the thickening of the lamina is a hypertrophy, in that the spongy parenchyma has changed to palisade-like cells. Of interest also is the anatomical characteristic of the so-called short needles of *Tsuga* which are not only very small compared to the normal needles, but show a distinct iso-lateral leaf structure instead of the bi-facial structure common to the larger needles.—*Ernst Artschwager.*

1000. Molisch, Hans. **Beiträge zur Mikrochemie der Pflanze. [Contribution to the micro-chemistry of plants.]** Ber. Deutsch. Bot. Ges. 36: 474–481. 1919.—Giant silicious crystals are found in the leaf of *Arundo Donax* and are in size only second to the silica crystals found in the endocarp of *Phytelephas*. They can be readily observed by putting the leaf in phenol or macerating the tissue by chrom-sulphuric acid. Cystoliths have the ability to reduce silver nitrate and silver sulphate so strongly that they turn black in a very short time, owing to the calcium carbonate present in them. They are colored blue-violet with gold chloride, rose red with iron sulphate, pale green with nickel sulphate, pinkish or rose red with cobalt chloride and cobalt sulphate, owing to the precipitation of the hydroxide by the calcium carbonate present in the cystoliths.—*Ernst Artschwager.*

1001. Moxley, George L. **Petalody of the stamens in Eschscholtzia.** Bull. Southern California Acad. Sci. 18: 79. 1919.

1002. Osborn, T. G. B. **Some observations on the tuber of Phylloglossum.** Ann. Botany 33: 485–516. *Pl. 28, fig. 1–43.* 1919.—*Phylloglossum Drummondi* grows in a region of South Australia subject to prolonged summer desiccation, and therefore characterized by a geophytic flora. The tuber is an efficient organ of perennation under these conditions. A single tuber is normally produced each year, not from the one of the previous season but from the stem of the plant some distance above the old one, and becomes buried by the growth of its stalk. Frequently also tubers are produced from leaves which have been injured or detached by accidental causes. (The results of many laboratory experiments on this form of regeneration are given.) There is first produced an adventitious "cell mass." On this a growing point appears which develops into a stalked tuber like that of the normal plant. The "cell mass" and the tuber are regarded as two distinct and independent structures, the former representing the protocorm of lycopods, and the latter a special adaptation in which *Phylloglossum* has improved upon the lycopod structure. The results of the investigation strongly emphasize the "biological" as opposed to the phylogenetic significance not only of this tuber but also of the protocorm of lycopods. The view that the tuber is morphologically a modified branch is not justified even on anatomical grounds. It is an adventitious growth of very great ecologic value.—*W. P. Thompson.*

1003. Péchoutre, F. **Revue de botanique. [Review of botany.]** Rev. Gén. Sci. Pures et Appliquées 30: 242-250. 1919.—See Bot. Absts. 4, Entry 176.

1004. Schulz, A. **Lathyrus montanus Bernh. mit verkümmertem Oberblatt.** [Lathyrus montanus Bernh. with dwarfed blade and petiole.] Ber. Deutsch. Bot. Ges. 36: 572–574. 1918. —The plant examined has normally developed stipules but much reduced leaves. Not only the leaf blade but the petiole as well is dwarfed, attaining only half the size of the stipules. Apparently there is a growth correlation between stipules and leaves; at least similar anomalous structures have been reported by Goebel and others who found that a reduction in the size of the foliage leaves is accompanied by an increased development of the stipules. In this case, however, the stipules remained normal as to size.—*Ernst Artschwager.*

1005. Sinnott, E. W. **Size variation in secondary xylem.** [Rev. of: Bailey, I. W., and W. W. Tupper. **Size variation in tracheary cells. I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms, and angiosperms.** Proc. Amer. Acad. Arts and Sci. 53: 149–204. *6 fig.* 1918.] Bot. Gaz. 67: 374. 1919.—See Bot. Absts. 1, Entries 584, 998.

1006. Worsdell, W. C. **The origin and meaning of medullary (intraxylary) phloem in the stems of dicotyledons. II. Compositae.** Ann. Botany 33: 421–458. *Fig. 1–27.* 1919.—The author's theory that the "internal-phloem" strands constitute an inner series of bundles belonging to a fundamentally monocotyledonous type of vascular system is here applied to the Compositae in particular and in general to most of the other orders of dicotyledons. The vascular conditions in a large number of species belonging to many genera of Compositae are described and may be summarized as follows: (1) The main vascular cylinder of the stem is loosely constituted and the bundles are irregularly alined in the vascular ring; (2) The occurrence of the medullary strands is highly variable; within the same genus they are present in the stem of some species and absent in others; within the same species they are present in some individuals and absent in others; in many cases they are completely absent or very rudimentary in the stem but conspicuously present in the leaf; in many genera they are entirely absent in all regions; (3) The degree of development of the medullary strands is also variable; some are throughout well developed vascular bundles, some consist of phloem only, while some exhibit both phloem and xylem in part of their course and in another part phloem only; (4) In regard to the course (downwards) of the strands, some arise from flowers, some from the vascular ring of the main stem, some from lateral branches and some *de novo* in the pith; they may branch, fuse with one another or the main vascular ring, or die out *in situ.*—From these and other facts the author draws the following conclusions: (1) The intraxylary phloem of Compositae is a vestige of a formerly well developed system of medullary bundles; (2) These bundles together with those of the vascular ring constituted a scattered, monocotyledonous type of vascular system; (3) This monocotyledonous system was a normal feature not only of this order, or its ancestors, but also of many other dicotyledonous orders; (4) The conservative foliar organs often retain the ancestral condition when it has become extinct or nearly so in the stem; (5) The Compositae as well as most other dicotyledonous natural orders have been derived from a monocotyledonous stock of geophytic habit. —*W. P. Thompson.*

1007. Youngken, Heber W. **Notes on the dasheen and chayote.** Amer. Jour. Bot. 6: 380–386. *Fig. 1–5.* 1919.—See Bot. Absts. 4, Entry 976.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*

1008. Allen, E. J. **A contribution to the quantitative study of Plankton.** Jour. Marine Biol. Assoc. United Kingdom 12: 1–8. 1919.—Briefly reviews the published work of others and describes the application of the centrifuge and culture method, familiar to bacteriologists, to the study of the diatoms, flagellates, etc. of the sea. By this means the author found 464 organisms, exclusive of bacteria, per cc. of sea-water, and concludes, since not all sea-organisms will grow in the culture media employed, that the number present was probably nearer 1,000 per cc.—*G. J. Peirce.*

1009. Anonymous. [Rev. of: Church, A. H. The building of an autotrophic flagellate. Bot. Mem. no. 1. *27 p.* Oxford Univ. Press. 1919.] Jour. Botany 57: 288–290. 1919.

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With the beginning of the modern era, comparative morphology was born, and conceptions of evolution began to appear. Contributions to our knowledge of the brown algae were made by Bornet, Thuret, Janckewski, Guignard, Berthold, Reinke, Oltmanns, and others. The latest official review of this group is that of Kjellman (1891): The most complete systematic text is that of De Toni (1895): and the most complete text-book is that of Oltmanns (1904–15). Morphology of the brown algae has been best dealt with by Reinke and Oltmanns; while Kuckuck has set the highest standard of draughtsmanship for cells and tissues. The opening years of the present century show progress along the ecological side.—*K. M. Wiegand.*

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rounds up, and finally is detached. Fertilization was not observed but the oospores were observed to germinate and their growth followed for several weeks until the cultures were lost through decay. At that time the filaments had reached the 3-celled stage.—*L. I. Burlingame.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1032. AMANN, J., AND C. MEYLAN. **Flore des mousses de la Suisse. [Moss flora of Switzerland.]** *v. 1, 215 p., v. 2, 5 + 414 p. Pl. 1–12.* L'Herbier Boissier: Geneva, 1918.—In the second part the collaboration of P. Culmann is also acknowledged. Both parts bear the separate date of 1912 and indicate Lausanne as the intended place of publication. The work represents the first attempt at a comprehensive treatment of the mosses of Switzerland since the appearance of Lesquereux's Catalogue des mousses de la Suisse in 1845. The first part, aside from introductory suggestions for the study of mosses, is devoted to an original combination of keys and descriptions for the identification of the Swiss mosses; it includes in fact most of the species that have been proposed from all parts of Europe. Although in certain groups supplementary keys are given in the second part, this is primarily a "Bryogéographie," giving complete lists of localities of the Swiss species so far as known and including the other European species in finer print with a general statement of the regions where they are known to occur. Subspecies are designated as species of the second rank, a few species of the third rank are likewise included, and a multitude of varietal forms are recognized. Notes are often added calling attention to intergrading forms between species or to other observations and opinions of the senior author or his collaborators. The following apparently new species names are offered, the author in each case being Amann, unless otherwise noted: *Bryum albulanum, B. Baurii, B. callicarpum, B. Colombi* Meylan, *B. gypsophilum, B. jamanense* (reduced on a later page to a synonym of *B. inflatum* Phil.), *B. juranum, B. microcaespiticium, B. microlacustre* (replacing *B. parvulum* Amann of an earlier page), *B. oeneiforme* (on a later page apparently identified with *B. Dixoni* Card.), *B. pallidocuspidatum, B. pseudo-Graefianum, B. purpureo-aristatum, B. rosulatum* (not C. Müll., 1856), *B. Ruedianum, B. scoticum, B. valesiacum, Ceratodon crassinervis* (not Lorentz, 1866), *Dicranoweisia intermedia, Dicranum latifolium* (not Hedw., 1787), *Eurhynchium nivium, Ptychodium trisulcatum, Schistidium papillosum* Culmann, *Syntricia spuria* and *Trichostomum Fleischeri* Bauer. The first two plates deal with general matters helpful to moss-students; the others illustrate species or forms which are new or not well understood.—*A. LeRoy Andrews.*

1033. BROWN, MABEL MARY. **The development of the gametophyte and the distribution of sexual characters in Funaria hygrometrica (L.) Schreb.** Amer. Jour. Bot. 6: 387–400. *Pl. 36.* 1919.—Spores sown on the surface of Marchal's solution produced protonemata which were transferred singly by a needle to the surface of sterilized soil in pots. The resulting single-spore cultures have been under observation for 2 years, and still remain uncontaminated by other mosses. Leafy axes are produced about eight weeks after germination, and the first antheridia appear 4 to 6 weeks later. This species is strictly monoecious, the spores, protonemata, and gametophores being bisexual in their potentialities. Synoicous inflorescences occur on about 14 per cent of the gametophores. Antheridia always appear before archegonia, and are typically produced on the apex of the primary axis of the gametophore, with the archegonia on lateral innovations. Other arrangements often occur.—*G. S. Torrey.*

1034. CAMPBELL, DOUGLAS HOUGHTON. **The structure and development of mosses and ferns.** 3d ed. *8 vo. 708 p.* Macmillan Co.: New York, 1918.—See Bot. Absts. 3, Entry 690.

1035. DOUIN, CH. **Recherches des Cephaloziella. [Quest of the Cephaloziellas.]** Rev. Bryologique 41: 83–84. 1914. [Issued in 1919.]—Suggestive notes are given regarding the external conditions under which the various species of *Cephaloziella* attain their best develop-

ment. Most of them require a considerable amount of light and prefer a relatively low humidity. In temperate regions they are in their most luxuriant condition during the months of October and November.—*A. W. Evans.*

1036. Evans, Alexander W. **Three South American species of Asterella.** Bull. Torrey Bot. Club **46**: 469–480. 1919.—*Asterella chilensis* (Mont.) comb. nov., *A. macropoda* (Spruce) comb. nov., and *A. boliviana* (Steph.) comb. nov. are the species discussed.—*P. A. Munz.*

1037. Graham, Margaret. **Centrosomes in fertilization stages of Preissia quadrata (Scop.), Nees.** Ann. Botany **32**: 415–420. *Pl. 10.* 1918.—The occurrence of centrosomes and asters is demonstrated in the egg cell of *Preissia quadrata* after the entrance of the antherozoid but before the fusion of the male and female nuclei. The centrosomes occur at the opposite poles of the female nucleus and the astral rays, which are not numerous, converge upon the centrosomes. Similar centrosomes and asters are shown also in the cells of the young sporophyte.—*A. W. Evans.*

1038. Graham, Margaret. **Centrosomes during early fertilization stages in Preissia quadrata.** Mem. Torrey Bot. Club **17**: 323–325. *Pl. 8.* 1918.—See Bot. Absts. 2, Entry 79; also preceding Entry, 1037.

1039. Mottier, D. M. **Chondriosomes and the primordia of chloroplasts and leucoplasts.** Ann. Botany **32**: 91–114. *Pl. 1.* 1918.—See Bot. Absts. 2, Entry 81; 4, Entry 686.

1040. Negai, Isaburo. **Induced adventitious growth in the gemmae of Marchantia.** Bot. Mag. Tokyo **33**: 99–109. *Figs. 1–5.* 1919.—See Bot. Absts. 3, Entry 2902.

1041. Thériot, I. **Mousses de l'Annam. [Mosses of Anam.]** Recuéil Publ. Soc. Havraise d'Étud. Diverses **1919**: 33–47. *Pl. 1, 2.* 1919.—The present paper is based on a collection made in 1912 by A. Krempf along the southern coast of Anam. Of the 28 species enumerated 13 are known also from the Sunda Islands. The following are proposed as new and figured on the two plates: *Ectropothecium annamense, Homaliodendron crassinervium, Leucobryum Krempfii, Leucoloma annamense, L. Krempfii, Neckeropsis Krempfii* and *Pinnatella* (?) *corrugata* Cardot & Thériot.—*A. W. Evans.*

1042. Thériot, I. **Contribution a la flore byrologique du Chili. [Contribution to the bryological flora of Chile.]** Rev. Chilena Hist. Nat. **22**: 79–92. *Pl. 5, 6.* 1918.—This is the third article published by the author under the above title. It is based on a collection of mosses made by José A. Campo in the vicinity of Victoria, Chile. Thirty-seven species and varieties are enumerated with citation of specimens and many critical observations are included. The following species are described as new: *Campylopus Campoanus, C. carbonicolus, Tortula obscuriretis, Stereodon Campoanus,* and *Eurhynchium confusum.* These, together with *Rigodium mano-fasciculatum* C. Müll., are figured on the plates.—*A. W. Evans.*

1043. Watson, W. **The bryophytes and lichens of calcareous soil.** Jour. Ecol. **6**: 189–198. 1918.—See Bot. Absts. 4, Entry 309.

1044. Wheldon, J. A. **Notes on Braithwaite's Sphagnaceae exsiccatae.** Jour. Botany **57**: 142–147. 1919.—These exsiccatae were issued while Braithwaite's work, the "Sphagnaceae or Peat Mosses of Europe and America," was in preparation, and the set under consideration was dated April, 1877. The present author believes that the various sets were not all alike and notes the fact that very few of the specimens were collected by Braithwaite himself. One of the numbers, issued under the name *S. subsecundum* var. *contortum,* proves to be a form of *S. bavaricum* Warnst., thus confirming Bellerby's record of that species. At the conclusion of the paper a list of the specimens in the exsiccatae is given, named according to Wheldon's Synopsis of European Sphagna. Fifty-two numbers are included, with notes and synonymy under each.—*K. M. Wiegand.*

1045. Woodburn, William L. **Preliminary notes on the embryology of Reboulia hemisphaerica.** Bull. Torrey Bot. Club 46: 461–464. *Pl. 19.* 1919.—Some observations are made on the behavior of the sperm nucleus in early stages of fusion. The earliest divisions of the zygote are transverse and may form a tier of four cells, or may be more irregular. The hypobasal cell evidently forms the foot, and the epibasal the stalk and the capsule.—*P. A. Munz.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. Olive, *Editor*

H. M. Fitzpatrick, *Assistant Editor*

1046. Anonymous. **Botrytis.** Kew Bull. Misc. Inf. [London] **1919**: 93. 1919.

1047. Anonymous [B. O. Dodge.] **Index to American mycological literature.** Mycologia **11**: 284–287, 323–326. 1919.

1048. Anonymous. **Onion diseases.** Kew Bull. Misc. Inf. [London] **1919**: 92. 1919.—See Bot. Absts. 3, Entry 2546.

1049. Anonymous. **Potato disease.** Kew Bull. Misc. Inf. [London] **1919**: 94. 1919.—See Bot. Absts. 3, Entry 2545.

1050. Anonymous. **Fungi from Singapore and also from Penang. "Fungi Singaporensis Bakeriani."** Gardens' Bull. Straits Settlements **2**: 116–120. 1919.—An enumeration of eighty-nine fungi collected by C. F. Baker during his service with the Government of the Straits Settlements, and enumerated by Saccardo in the "Bulletino del Orto Botanico Reale di Napoli, vol. VI (1918)."—*S. F. Trelease.*

1051. Anonymous. **Echinodia theobromae, Pat. [English translation from French.]** Gardens' Bull. Straits Settlement **2**: 144–145. 1919.—English translation of a description of *Echinodia theobromae* Pat. by N. Patouillard in the "Bulletin de la Societe Mycologique de France, **34**: 2nd Fasicle."—*S. F. Trelease.*

1052. Anonymous. [Rev. of: Sée, Pierre. **La florule du papier. Étude systematique et biologique des champignons chromogènes du papier piqué. Nature, origine, agents et remèdes de l'alteration des papiers. (The flora on paper. Systematic and biologic study of the chromogenic fungi on spotted paper. Nature, origin of these fungi, their action in changing the paper and remedies to prevent their growth.)** Thesis presented for the degree of doctor of natural sciences. *Pamphlet, 168 p., 17 pl. Paris, 1919.*] Jour. de Pharm. et de Chim. **20**: 99–100, 1919.—The author found amongst perfect fungi *Chaetomium*, *Myxothrichum*, etc., amongst fertile filamentary forms *Stachybotrys* and *Aspergillus* and a sterile *Fusarium*, and amongst fumagoid forms *Alternaria* and *Stemphylium.*—*H. Englehardt.*

1053. Arthur, J. C., and E. B. Mains. **Grass rusts of unusual structure.** Bull. Torrey Bot. Club **46**: 411–415. *Fig. 1–2.* 1919.—Leaves of the species of *Olyra* of the Paniceae resemble very closely those of certain bamboos, although the two are not related. The rusts on these genera have also been confused and in this paper, a comparison is drawn between three tropical rusts: *Puccinia pallescens* on *Tripsacum*, *Puccinia phaksopsoroides* on *Olyra*, and *Uredo ignava* on *Bambos*. *Puccinia phaksopsoroides* is described as a new species.—*P. A. Munz.*

1054. Baker, C. F. **Hevea versus fungi.** Gardens' Bull. Straits Settlements **2**: 109–113. 1919.—See Bot. Absts. 4, Entry 1235.

1055. Bataille, F. Decouverti en France d'une nouvelle station du Phallus impudicus, var. imperialis (Schulz) Lloid. [The discovery of a new place for Phallus impudicus, var. imperialis in France.] Bull. Trimest. Soc. Mycolog. France 34: 195-197. 1919.—The author mentions that *Phallus impudicus*, var. *imperialis*, a rare variety, was collected in 1915 on the battlefield of Champagne, France.—*Fred C. Werkenthin.*

1056. Beauverie, J. [Rev. of: Vincens, F. Recherches organogéniques sur quelques Hypocréales. (Organogenic researches on Hypocreales.) Thése Fac. Sci. Paris. *170 p. Pl. 3, fig. 71.* 1917.] Rev. Gén. Bot. 31: 122-125. 1919.

1057. Boas. [Rev. of: Dietel, P. Ueber einige neue oder bemerkenswerte Arten von Puccinia. (New and interesting species of Puccinia.) Ann. Mycolog. 15: 492-494. 1917.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.

1058. Boas. [Rev. of: Neger, F. W. Experimentelle Untersuchungen über Russtaupilze. (Experimental studies of sooty fungi.) Flora 10: 67-139. 1917.] Zeitschr. Pflanzenkrankh. 29: 64-65. 1919.—Author discusses fungi causing sooty coverings, generally referred to as *Capnodium* and *Fumago.* In reality this deposit is a mixture of more or less numerous species living upon honeydew covered leaves. Most general are:—*Dematium pullulans, Cladosporium herbarum, Penicillium* spp., *Botrytis cinerea*, yeasts, and bacteria. [See Bot. Absts. 1, Entry 1667.]—*H. T. Güssow.*

1059. Boas. [Rev. of: Wartenweiler, H. Beiträge zur Kenntnis der Gattung Plasmopara. [On the genus Plasmopara.) Ann. Mycolog. 15: 495-497. 1917.] Zeitschr. Pflanzenkrankh. 29: 62. 1919.

1060. Bottomley, Averil Maud. A preliminary investigation into a disease attacking young Cupressus plants. South African Jour. Sci. 15: 613-617. *Pl. 18-21.* 1919.—See Bot. Absts. 4, Entry 1244.

1061. Brierly, W. B. Some concepts in mycology—an attempt at synthesis. Trans. British Mycol. Soc. 6: 204-235. 1919.—The author points out that many concepts in biology fail to correspond to reality. The species concept is one of these. He then at considerable length discusses the undesirability of following the methods of the older school of systematists in attempting to delimit species on morphological characters. Another questionable concept called to attention is termed the "educability of fungi." In this connection doubt is expressed concerning the possibility of changing the inherent characters of organisms under control conditions. The paper is fundamental in its application to the study of the fungi and much literature bearing on the general subject is cited. It will prove of interest to students who are concerned with biological species, with the growing of fungi on differential media, with the phenomenon of facultative parasitism, and other kindred matters.—*H. M. Fitzpatrick.*

1062. Briosi, G., and R. Farneti. La moria dei Castagni (mal dell' inchiostro.) [Black canker of chestnut.] Atti Ist. Bot. Univ. Pavia 2, 15: 43-51. *Fig. 1-2.* 1918.—See Bot. Absts. 3, Entry 2579.

1063. Buder, J. Zur Biologie des Bakteriopurpurins und der Purpurbakterien. [Contribution to the biology of the purple bacteria and their pigments.] Jahrb. Wiss. Bot. 58: 525-628. *Pl. 5, fig. 1-5.* 1919.—See Bot. Absts. 4, Entry 1429.

1064. Burt, E. A. Merulius in North America, supplementary notes. Ann. Missouri Bot. Gard. 6: 143-145. 1919.—*Merulius rubellus*, regarded as a synonym of *M. incarnatus* Schw. in Burt's work on "Merulius in North America," is a good species and should take the place of *M. incarnatus* in the key to species in that paper. *Merulius incarnatus* "is the common species with snow-white effuso-reflexed pileus, garnet-colored hymenium, large decompound pores, and small allantoid spores, of the eastern United States," and probably should as hith-

erto, be referred as a form of *M. tremellosus*. Further specimens of *M. hirsutus*, *M. lacrymans* and *M. rimosus* are cited.—*S. M. Zeller.*

1065. Burt, E. A. **An edible garden Hebeloma.** Ann. Missouri Bot. Gard. **6**: 171–174. *Pl. 3.* 1919.—*Hebeloma hortense*, reported as a palatable and delicious mushroom, is described as new.—*S. M. Zeller.*

1066. Burt, E. A. **Protomerulius Farlowii Burt, n. sp.** Ann. Missouri Bot. Gard. **6**: 175–177. *1 fig.* 1919.

1067. Carpenter, C. W. **Report of the division of plant pathology.** Hawaii Agric. Exp. Sta. Rept. **1918**: 10, 35–45. *Pl. 8–10.* 1919.—See Bot. Absts. 3, Entry 2593.

1068. Chenantais, J.-E. **Études sur les Pyrénomycetes (Suite) (1).** [A study of the Pyrenomycetes. (Cont.) (1).] Bull. Trimest. Soc. Mycolog. France **34**: 123–136. *Fig. 1–2.* 1919.—The author discusses the genus *Lophiotrema.*—*Fred C. Werkenthin.*

1069. Chenantais, J.-E. **Études sur les Pyrénomycètes (Suite et fin).** [A study of the Pyrenomycetes (Continuation and end).] Bull. Trimest. Soc. Mycolog. France **35**: 113–139. *Pl. 1–6, fig. 1–10.* 1919.—This discussion of the Pyrenomycetes gives a list of new forms and new varieties as follows: *Zignoella insueta* Chen. n. form; *Pseudovalsa macrosperma fenestrata* (Tul.) n. var.; *Schizostoma byssisedum* Flag. et Chen. n. form; *Saccardoella Montellica Rubi* (Speg.) Chen. n. form; *Neopeckia anceps* Chen. n. form; *Didymella eutypoides* Chen., n. form; *Neopeckia Carpini* Chen. et Flag n. form.—*Fred C. Werkenthin.*

1070. Cleland, J. Burton, and Edwin Cheel. **Australian fungi: notes and descriptions, No. 1.** Trans. Roy. Soc. South Australia **42**: 88–138. *Pl. 9–12.* 1918.—This paper is given over entirely to a description of the mushrooms of Australia; 80 species are dealt with in considerable detail, and of these ten are described as new. This paper is accompanied by four colored plates.—*J. H. Faull.*

1071. Coerper, Florence M. **Bacterial blight of soybean.** Jour. Agric. Res. **18**: 179–193. *Pl. A (colored)* and *12–18. 1 fig.* 1919.—See Bot. Absts. 4, Entry 1268.

1072. Conn, H. J., and J. W. Bright. **Ammonification of manure in soil.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 67. *45 p.* 1919.—See Bot. Absts. 3, Entry 850; 4, Entry 1643.

1073. Cotton, A. D. **The occurrence of oak mildew on beech in Britain.** Trans. British Mycol. Soc. **6**: 198–200. 1919.—*Microsphaera Alni.*

1074. Cotton, A. D. **Entomogenous fungi new to Britain.** Trans. British Mycol. Soc. **6**: 200–203. 1919.—Few entomogenous fungi have been recorded for the British Isles and *Empusa aphidis* Hoff., *Empusa Fresenii* Nowakowski, *Empusa sphaerosperma* Fresen., and *Cladosporium aphidis* Thüm are listed here as new.—*H. M. Fitzpatrick.*

1075. Cotton, A. D., and E. M. Wakefield. **A revision of the British Clavariae.** Trans. British Mycol. Soc. **6**: 164–198. 1919.—This paper is not claimed to be a complete monograph of the British species of the genus, but it is felt that though new species may be subsequently added little fundamental alteration will be necessary in the work already covered. The present revision includes 37 species. Two of these are new and four others have been previously described in recent years by Cotton. One species, *Cl. fastigiata*, is reduced to the rank of a variety and given as *Cl. corniculata* var. *pratensis*. Twenty-two names have been excluded from the British list as synonyms or indeterminables. A key is provided for the separation of the species, and macroscopic characters are used where possible, though spore measurements are frequently also stated. The monograph is not illustrated. The authors hope to prepare a monograph of the world's species of the genus at a later date.—*H. M. Fitzpatrick.*

1076. Coulter, J. M. **Rusts of Costa Rica.** [Rev. of: Arthur, J. C. **Uredinales of Costa Rica based on collections by E. W. D. Holway.** Mycologia 10: 111–154. 1918.] Bot. Gaz. 67: 184. 1919.—See Bot. Absts. 1, Entry 384.

1077. Coulter, J. M. **Hydnaceae of North Carolina.** [Rev. of: Coker, W. C. **The Hydnums of North Carolina.** Jour. Elisha Mitchell Sci. Soc. 34: 163–197. *29 pl.* 1919.] Bot. Gaz. 68: 72. 1919.

1078. Coulter, J. M. **Agaricaceae of Michigan.** [Rev. of: Kauffman, C. H. **The Agaricaceae of Michigan.** Mich. Geol. Biol. Surv. Publ. 26 (Biol. Ser. 5). Vol. 1: *924 p. 4 fig.* 1918.] Bot. Gaz. 67: 279–280. 1919.—See Bot. Absts. 2, Entry 627.

1079. Crossley, M. L. **Gentian violet—its selective bactericidal action.** Jour. Amer. Chem. Soc. 41: 2083–2090. 1919.

1080. Demange, V. **Notes sur quelques champignons comestibles, vénéneux ou curieux du Tonkin et de l'Annam.** [**Notes on some edible, poisonous or curious mushrooms of Tonkin and Annam.**] Bull. Econ. Indochine 22: 592–609. *Fig. 1–16.* 1919.—A somewhat popular account of about 50 species observed by the author.—*E. D. Merrill.*

1081. De Waal, J. W. **Het aantoonen van bacterium coli in drink water.** [**Detection of bacterium coli in drinking water.**] Pharm. Weekblad 56: 1065–1070. 1919.—A review of the various methods for detecting coli bacilli and a detailed description of the fermentation method by means of Kubel-Tiemann's culture medium.—*H. Engelhardt.*

1082. Doidge, Ethel M. **An interesting group of leaf fungi.** South African Jour. Nat. Hist. 1: 164–171. *Pl. 7–9.* 1919.—A more or less popular account of fungi belonging to the Perisporiaceae and the Microthyriaceae, which occur plentifully in some parts of South Africa. Instructions are given for collecting and preserving these fungi and for making permanent microscopic preparations.—*E. M. Doidge.*

1083. Dufour, L. [Rev. of: Arnaud. **Les Asterinees.** (**The Asterineae.**) Thèse Fac. Sci. Paris 1918.] Rev. Gén. Bot. 31: 414–416. 1919.

1084. Dufrenoy, Jean. **Metaphanic and progressive variation in Beauveria: its phyletic significance.** Mycologia 11: 276–277. 1919.—Observations on spore formation in *Beauveria globulifera*, an insect inhabiting fungus, show phases varying from a budding process to a complex conidial system. This is believed to be of phylogenetic significance as the various conidial forms "actually link the *Beauveria* both to the lower and to the higher Conidiosporae."—*H. R. Rosen.*

1085. Dufrenoy, J. **Une Sphériacée parasite des feuilles d'Arbousier.** [**A parasitic fungus on leaves of arbutus belonging to the Sphaeriaceae.**] Bull. Trimest. Soc. Mycolog. France 34: 99–100. *Fig. 1.* 1919.—The author gives a brief description of a parasitic fungus on leaves of *Arbutus Unedo*, which on account of the simple ascospores seems to fall into the genus *Guignardia* and the species *G. Vaccinii.* The text figure illustrates the perithecium of *Guignardia* sp. n.—*Fred C. Werkenthin.*

1086. Dumée, P. **Quelques mots dur le Nidularia confluens Fr.** [**A brief discussion of Nidularia confluens Fr.**] Bull. Trimest. Soc. Mycolog. France 34: 97–98. 1918.—The author briefly discusses *Nidularia confluens* which was collected in the forest of Sénart in December, 1917.—*Fred C. Werkenthin.*

1087. Durfee, Thomas. **Lichens of the Mt. Monadnock region, N. H.—No. 11.** Bryologist 22: 15–16. 1919.—Fifteen species are listed without localities.—*Edward B. Chamberlain.*

1088. Durrell, L. W. **The imperfect stage of Leptosphaeria tritici of wheat.** Science **50**: 252–253. 1919.—In connection with studies of anthracnose of small grains, a species of what seemed to be an *Ascochyta* has frequently been found on dead straw. Recently, while culturing *Leptosphaeria tritici*, the relationship of these two forms has been revealed. The pycnidial fruiting bodies grow side by side with the perithecia of *L. tritici*, on dead wheat straw in the spring. The pycnidia are filled with guttulate spores, usually two-celled, and approximately 12–20 x 3.4–4 μ. Single spore cultures of the ascospores of *L. tritici* obtained by the Hansen method of isolation, produce on potato agar and on sterile straw, pycnidia and pycnospores like those found growing with the perithecia on the wheat plant.——*A. H. Chivers.*

1089. Edgerton, C. W. **A new Balansia on Cyperus.** Mycologia **11**: 259–261. *Pl. 12.* 1919.—The fruiting parts of *Cyperus virens* are found to be displaced by large black sclerotia. Young sclerotia develop hyaline conidia. Perithecia are developed in the outer layer of the mature sclerotium. A technical description of *Balansia cyperi* sp. nov. is presented.—*H. R. Rosen.*

1090. Elliott, Jessie S. Bayliss. **On the method of growth of the conidial clusters of Trichothecium roseum.** Trans. British Mycol. Soc. **6**: 37–38. *Fig. 1–4.* 1918.—The conidia are found not to be inserted, as usually figured, at the same level at the tip of the conidiophore. By a peculiar basipetal method of growth long chains or racemes of conidia are formed which are pendant from the apex of the conidiophore. The details of the process are figured.—*H. M. Fitzpatrick.*

1091. Elliott, Jessie S. Bayliss. **Some new species of fungi imperfecti.** Trans. British Mycol. Soc. **6**: 56–61. *Pl. 1.* 1918.—*Aegerita viridis* n. sp. and *Clonostachys dichotoma* n. sp. on rotten wood, and *Dendrodochium album* n. sp. and *Trichocrea oödes* n. sp. on fallen pine cones are described and figured. *Haplographium fusoipes* (Preuss) Sacc. and *Sterigmatocystis phaeocephala* Sacc. are recorded for the first time for the British Isles, and are also figured.—*H. M. Fitzpatrick.*

1092. Eriksson, Jakob. **Etudes biologiques et systematiques sur les Gymnosporangium suedois. [Taxonomy of Gymnosporangium in Sweden.]** Compt. Rend. Acad. Sci. Paris **168**: 470–473. 1919.—In Sweden two species of *Gymnosporangium* occur on *Juniperus communis*—*G. clavariaeforme* (Jacq.) DC. and *G. tremelloides* (A.Br.) v. Treb. Of the former three biologically different forms occur in different countries, as follows: 1. f.sp. *Crataegi*, with aecidia, *Rostelia lacerata* (Sow.) Fr., on various species of *Crataegus*, rarely on *Cydonia vulgaris* and *Pyrus malus*, as well as on *Amelanchier canadensis*. *A. erecta* and *A. vulgaris*. 2. f.sp. *Pyrus communis*, with aecidia on *Pyrus malus*, exceptionally on *Crataegus*, *Cydonia vulgaris* and *Amelanchier vulgaris*. 3. f.sp. *Amelanchieris*, with aecidia on various species of *Amelanchier*. Five biologically different forms of *Gymnosporangium tremelloides* occur in different countries, as follows: (1) f.sp. *Aucupariae*, with aecidia, *Rostelia cornuta* (Pers.) Mull., on *Sorbus Aucuparia*, occasionally on *Cydonia vulgaris*, and rarely on *Sorbus Aria* and *Pyrus malus*. (2) f.sp. *Mali*, with aecidium, *Roestelia penicillata* (Mull.) Fr., on *Pyrus* malus, occasionally on *Cydonia vulgaris*, rarely on *Pyrus communis* and *Sorbus Aucuparia*. (3) f.sp. *Amelachieris*, with aecidium, *Roestelia Amelanchieris* (DC.) Roun., on *Amelanchier vulgaris*. (4) f.sp. *Torminalis*, with aecidium on *Sorbus Torminalis* and *S. latifolia*, and occasionally on *S. Aria*, *S. chamaemespilus* and *S. hybrida*. (5) f.sp. *Ariae*, with aecidium on *Sorbus Aria*, occasionally on *S. Chamaemespilus*. In southern Sweden an aecidial stage on pear was also found, which appeared to belong to *Gymnosporangium clavariae* f.sp. *Pyricommunis*.—*F. B. Wann.*

1093. Eriksson, Jacob. **Zwei russische Gymnosporangieen. [Two Russian Gymnosporangia.]** Ark. Bot. [Stockholm] **15**: 1–23. *Pl. 1–3.* 1919.—The author describes two species of *Gymnosporangium* obtained from Russian sources and gives the results of numerous cross inoculation experiments on several genera of *Pomeae*. As a result of his studies of the

fungi and his inoculations, he concludes that the two forms belong to the species *Oxycedri* Bres. and *tauricum* n. sp. The article is written in German and is illustrated by photographs of the specimens and by a colored plate showing spore forms and germination as well as spermogonia and Roestelia production on the leaves of species of *Crataegus*, *Mespilus* and *Cydonia*. [See Bot. Absts. 3, Entry 2128.]—*W. W. Gilbert.*

1094. Faull, J. H. **Pineapple fungus or enfant de pin or wabadou.** Mycologia 11: 267–272. 1919.—See Bot. Absts. 3, Entry 2802.

1095. Fink, Bruce. **Additions to lichen distribution in North America.** Mycologia 11: 296–307. 1919.—A list of 212 species of lichens many of them collected by the writer on the islands of Puget Sound. Locality, name of collector and substratum are noted under each species.—*H. R. Rosen.*

1096. Fink, Bruce. **British lichens.** [Rev. of: Smith, Annie Lorain. **A monograph of the British lichens.** Vol. 1. *519 p., 71 pl., 11 fig.* The British Museum. 1918.] Bot. Gaz. 67: 268. 1919.—The reviewer commends the work very highly, but criticises the author strongly for adhering to the concept of the duality of lichens.—*H. C. Cowles*

1097. Foex, Et. **L'oïdium brun des Euphorbes. [The brown Oidium of Euphorbia.]** Bull. Soc. Path. Vég. France 6: 31–34. 1919.—A mildew, *Sphaerotheca euphorbiae* (Cast.) Salm. is reported on *Euphorbia verrucosa* from Switzerland. Its relation to *Sphaerotheca mors-uvae* is discussed and the opinions of various authors cited. The fungus frequently occurs associated with *Uromyces scutellatus* (Schrank) Lév. which causes a hypertrophy of the host.—*C. L. Shear.*

1098. Foex, Et. **Emission et germination des Ascospores de Leptosphaeria herpotrichoides. [The discharge and germination of ascospores of Leptosphaeria herpotrichoides.]** Bull. Soc. Path. Vég. France 6: 57–61. 1919.—The expulsion of ascospores from perithecia placed in water is described. All the spores in an ascus are discharged en masse and are enveloped in a gelatinous substance which gradually dissolves and the spores separate. In germination of the spores a tube usually appears at the end and soon forms a brown appressorium. Further development of the mycelium is also described.—*C. L. Shear.*

1099. Foex, Et. **Sur le piétin du blé. [Foot-rot of wheat.]** Compt. Rend. Acad. Agric. France 5: 543–548. 1919.—See Bot. Absts. 3, Entry 2644.

1100. Foex, Et. **Note sur le piétin du blé. [Note on the foot disease of wheat.]** Bull. Soc. Path. Vég. France 6: 52–54. 1919.—See Bot. Absts. 3, Entry 2645.

1101. Gee, N. G. **A beginning of the study of the flora and fauna of Foochow and vicinity.** Jour. Roy. Asiatic Soc. North-China Branch 50: 170–184. 1919.—See Bot. Absts. 3, Entry 2460.

1102. Grove, W. B. **Species placed by Saccardo in the genus Phoma.** Kew Bull. Misc. Inf. [London] 1919: 177–201. *Illust.* 1919.—The author gives a critical account of various species assigned to *Phoma* by Saccardo in volume 3 of the Sylloge. It is a continuation of a previous paper by the same author in Kew Bull. Misc. Inf. 1917. **The British Species of Phomopsis.** Many of the species here considered are based upon specimens received by Berkeley or Cooke from the United States. Transfers of species of *Phoma* are made to *Colletotrichum*, *Cytospora*, *Dendrophoma*, *Diplodia*, *Dothiorella*, *Gloeosporium*, *Phomopsis*, *Pseudidiplodia* and *Rhabdospora*. The following species are described as new:—*Camarosporium wistariae*, *Coniothyrium ephedrinum*, *Laestadia ailanthi*, *Microdiplodia wistariae*, *Phomopsis viridarii* and *Phomopsis viticola ampelopsidis.*—*E. M. Wilcox.*

1103. Guba, E. T., and P. J. Anderson. **Phyllosticta leaf spot and damping off of snapdragons.** Phytopath. 9: 315–325. 1919.—See Bot. Absts. 4, Entry 1293.

1104. Guegan, Marcel. **Quelques remarques sur deux champignons communs.** [Remarks about two common fungi.] Bull. Trimest. Soc. Mycolog. France 34: 110. 1919.—The author says that about 15 years ago *Lepiota procera* was found in great quantities in certain grass lands, while today this Lepiota is almost extinct. *Cantharellus cibarius* according to the author is found in great abundance under fir trees, but such specimens are weak, colorless and without taste, while those found in mixed underwood although not found in large bunches are quite vigorous and highly colored.—*Fred C. Werkenthin.*

1105. Guilliermond, A. **Zygosaccharomyces Nadsonii; nouvelle espèce de levures à conjugaison hètèrogamique.** [Zygosaccharomyces Nadsonii. a new species of yeast.] Bull. Trimest. Soc. Mycolog. France 34: 111–122. *Pl. 4–7, fig. 1.* 1919.—The author describes a new species of yeast, *Zygosaccharmyces Nadsonii*, which was isolated from the syrup of bitter oranges. The formation of heterogametes by this species is illustrated by 70 drawings on plate VI.—*Fred C. Werkenthin.*

1106. Harder, Edmund Cecil. **Iron-depositing bacteria and their geologic relations.** U. S. Geol. Surv. Prof. Paper 113. *89 p., 14 fig., 12 pl.* (4to). 1919.—The field work on which these studies are based was done largely with the bog-iron deposits of the Cayuna Range, Minn., as well as with the waters of Wisconsin; the laboratory work largely at the University of Wisconsin. In addition to the higher filamentous, iron-depositing bacteria, the author has studied the iron-precipitating properties of certain almost universally distributed lower bacteria of soil and water, including coccus and bacillus forms. He concludes that there are three principal groups of iron-depositing bacteria: (1) those that precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide set free and the available energy of the reaction for their life processes; (2) those that do not require ferrous bicarbonate for their vital processes but that cause the deposition of ferric hydroxide when either inorganic or organic iron salts are present; and (3) those that attack iron salts of organic acids, using the organic acid radicle as food and leaving ferric hydroxide, or basic ferric salts that gradually change to ferric hydroxide. [See Bot. Absts. 4, Entry 1210.]—*E. W. Olive.*

1107. Havens, L. C. **A biologic classification of hemolytic streptococci.** Jour. Infect. Diseases 25: 315–330. 1919.

1108. Henderson, William F. **Some experiments conducted with pure cultures of bread yeast.** Trans. Amer. Microsc. Soc. 38: 221–227. *Pl. 23–24, 2 tables.* 1919.—Pure cultures of yeast were secured by the plate method from "Yeast Foam." Culture experiments showed that plain agar or agar plus a disaccharid served poorly as a culture medium; while agar plus monosaccharids, especially glucose and levulose, encouraged abundant growth. The morphology of the yeast cell was found greatly modified when grown to old cultures on solid media. Much elongation of the cell took place at the margin of the colony due to the exhaustion of food as the yeast progressed radially from the center of the colony. Branching was frequently found among the elongated cells. Yeast grows best under aerobic conditions; but will develop under "limited" anaerobic conditions. A maximum of gas was produced from glucose. Varying amounts were produced from other sugars.—*M. Mulvania.*

1109. Herrmann. [Rev. of: Miehe, H. **Die Bakterien und ihre Bedeutungin prachtichen Leben.** (Bacteria and their meaning in practical life.) *32 fig.* Leipzig. 1917.] Forst. Rundschau 20: 12–13. 1919.

1110. Hoerner, G. R. **Biologic forms of Puccinia coronata on oats.** Phytopath. 9: 309–314. *Pl. 19–20, 4 fig.* 1919.—See Bot. Absts. 4, Entry 1301.

1111. Höhnel, Franz V. **Fragmente zur Mykologie XIX. Mitteilung, Nr. 1001 bis 1030.** [Mycological Fragments XIX, 1001–1030.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 283–352. *Fig. 1–19.* 1917.—*Chaetostroma pedicillatum* Preuss is stated to be identical with *Volutella ciliata* (A. & S.) Fr. f. *minor* D. Sacc., and is made the type species of a

new genus Peniophorina which differs from Peniophora and Wiesnerina in having a shield- or cushion-shaped fruit body. A species of Claudopus found to be parasitic on *Tomentella* sp. is named *C. tomentellicola* v. Höhnel. Its possible identity with *Leptonia parasitica* Quélet and *C. subdepluens* Fitzpatrick is recognized. *Hypholoma lacrymabundum* Fr. and *Stropharia caput Medusae* Fr. are shown not to be identical as claimed by Ricken. The need of a new separation of the genera of the Hysteriaceae based on the relation of the fruit body to the host tissue is pointed out. To emphasize this point the fruit body in *Hypodermella Laricis* v. Tubeuf is shown to be intraepidermal while that in *Gloniella perexigua* (Speg.) Sacc. is subcuticular. An hitherto undescribed imperfect stage of the latter species is given as *Leptothyrina perexigua* v. H. n. sp. The perfect stage of *Leptothyrium Lunariae* Kze. is transferred from Microthyrium to Gloniella and cited as *Gloniella Lunariae* (Fckl.) v. H. n. comb. The genus Ascospora Fries is discarded because the type and other species are more properly placed elsewhere, and *A. microscopica* Niessl is transferred to Gloniella, being called *G. microscopica* (Niessl) v. H. The imperfect stage of this species is made the basis of a new genus, *Rhabdothyrella,* of the Leptostromataceae. This genus is closely related to, or perhaps identical with, Cystothyrium Speg. *Leptostroma virgultorum* Sacc., having been found closely associated on canes of Rubus with *Hypoderma Rubi* (P.), is regarded as its conidial stage. The fungus is transferred to Hypodermina v. H., and is called *Hypodermina virgultorum* (Sacc.) v. H. The statement is made that a new separation of the genera of the Hypodermineae and Phacidiaceae based on the relation of the fruit body to the host is necessary. This has already been supplied for the closely related group, the Dothideales. Since the fruit bodies of *Hypoderma scirpinum* DC. are subcuticular this species should be transferred to Gloniella Sacc. emend Rehm. A sharp and satisfactory separation could be accomplished by placing in Hypoderma the intraepidermal and in Gloniella the subcuticular species. When the genus Entopeltis v. H. was erected in 1910, doubt was expressed concerning its systematic position. It is now stated to be unquestionably a member of the Hypoderminae. The genus Vizella Saccardo is also placed here. In both genera the fruit bodies are subcuticular. *Phacidium Piceae* Fckl., placed by Rehm in Coccomyces, is here shown from an examination of the type material to be merely the form of *Lophodermium pinastri* (Schrad.) which occurs on the needles of the silver fir. Rostrup applied the name, *L. abietis* R., to this form stating that it differs in having shorter asci and spores. If this species is accepted the name, *L. Piceae* (Fckl.) v. H., must be used. The genus Pseudophacidium was founded by Karsten but was incorrectly characterized. The four species included by Karsten are here shown not to be of the same generic type. The type species *Ps. Ledi* (A. & S.) Karsten is retained in the genus and the generic characterization is emended. *Pseudophacidium degenerans* Karsten and *Ps. Rhododendri* Rehm are made the basis of a new genus, Myxophacidium, the first named being cited as the type. Four other species, *Ps. microspermum* (Fckl.) Rehm., *Ps. Rehmii* (Feltgen) v. H., *Ps. Betulae* Rehm, and *Ps. Callunae* Karsten, are made the basis of another new genus, Myxophacidiella, the first named species being cited as the type. The second new genus differs from the first in lacking paraphyses and in possessing long-stalked asci. Both genera are placed in the Phacidiaceae. *Pseudophacidium rugosum* (Fries) Rehm is shown to be more properly called *Phacidium rugosum* Fries. *Pseudophacidium atroviolaceum* v. H. is shown to be the same as *Phacidiella discolor* (Mout. et Sacc.) Potebnia, and to fall more properly in the latter genus. The genus Phacidiella, placed by Potebnia in the Pseudophacidiaceae is found to belong rather to the Stictidiaceae, and the generic characterization is emended from this standpoint. The imperfect stage of *Phacidiella discolor* (Mout. et Sacc.) Potebnia, called by Potebnia *Phacidiopycnis Malorum* P., is shown to be the same as *Cytispora Pyri* Fckl., and, since Phacidiopycnis Potebnia is known to be the same as Discula Sacc., the binomial *Discula Pyri* (Fckl.) v. H. is given. A comparative study is made of the five species included by Rehm in Stegia Fries. Sections show that the position of the fruit bodies in the host is different in the different species. Chiefly on this basis several new genera are erected. *Stegia Lauri* (Cald.) Sacc. is made the type of a new genus, Stegopeziza, a member of the Dermateaceae in which the ascomata are formed below the epidermis. *Stegia alpina* (Fckl.) Rehm is made the type of a new genus, Sarcotrochila, closely related to Trochila, and the ascomata are found to be intraepidermal. *Stegia subvelata* Rehm is made

the type of a new genus, *Hysteropezizella*, closely related to Hysteropeziza and with it forming a group between the Pyrenopezizaceae and the Mollisiaceae. Here the ascomata are developed below the epidermis. *Stegia fenestrata* (Roberge) Rehm is made the type of a new genus, Hysterostegiella, of the Hysteropezizaceae, differing from Hysteropezizella in that the ascomata are buried deeply in the host tissue. In Hysterostegiella is also included *Stictis valvata* Montagne. Throughout the entire paper frequent expression is given to the conviction that in the Hypodermineae, Euphacideae, Pseudophacideae, Stictidieae, Pseudopezizeae, Pyrenopezizeae and similar groups the classification will be placed on a sound basis only by giving attention to the position of the ascomata in the host tissue. *Naevia minutula* (Sacc. & Malbr.) Rehm, *N. exiqua* Mout. & Sacc., *Trochila Epilobii* Karsten, and *Peziza Tripolii* Berk. & Br. are transferred to the genus Phacidium. A detailed discussion of the synonomy of *Podophacidium terrestre* Niessl is given. Podophacidium Niessl (syn. Melachroia Boudier) is referred to the Tryblidiaceae. *Sphaeronema Spinella* Kalchbrenner is transferred to Cytonaema and discussed as the imperfect stage of *Tympanis saligna* Tode. The genus Cytonaema is removed from the Cytosporeae since its spores are not allantoid and is placed near Chondropodiella. The ascigerous stage of *Gelatinosporium pinastri* (Mougeot) v. H. is found to be a new species of Scleroderris and is named *S. pinastri* v. H. *Unguicularia raripila* v. H. n.sp. is described. It was collected on dead stems of *Lavatera thuringiaca* in Austria. From a study of *Habrostictis rubra* Fckl. (syn. *Peziza lasia* B. Br.) the conclusion is reached that the genera Habrostictis and Ocellaria are closely related. The genus Cheilodonta Boudier is retained for *Peziza carpoboloides* Crouan. *Pyrenopeziza Agrostemmatis* Fckl., regarded by Rehm as a doubtful species of Niptera and known hitherto only from the original description, is rediscovered on dead leaves of *Agrostemma Githago* together with the imperfect stage, *Gloeosporium Delastrei* Lacroix, on the stems. Examination of this material shows it to be in reality a species of Fabraea and the name *F. Agrostemmatis* (Fckl.) v. H. is proposed. *Fabrea implexa* Bres. & Carestia on Lychnis seems identical. The genus Diplosporonema is tentatively advanced for *Gloeosporium Delastrei* Lacroix which is shown not to be a Gloeosporium. *Peziza sphaeroides* var. *Lychnidis* Desmaz. is found to be the same as *Pirottaea veneta* Sacc. & Speg. The latter name takes precedence since the name applied by Desmazières is a *nomen nudum.* Examination of the original material of *Asteroma impressum* Fckl. leads to doubt concerning the validity of this species. *Peziza pulveracea* Alb. & Schw. is transferred to Dasyscypha and the synonomy is discussed. *Peziza echinophila* Bulliard, varously classified elsewhere, is here transferred to Rutstroemia. Lachnea (*Cheilymenia*) *furcifera* v. H. n. sp. is described. The validity of *Aposphaeriopsis fusco-atra* Diedicke is questioned, and its identity with certain other described species is suggested. *Nitschkea Flageoletiana* Sacc. is shown to be the same as *Microthyrium epimyces* Sacc., its identity with *Dothidea episphaeria* Peck is suspected, and its removal to the genus *Loranthomyces* v. H. is recommended. *Melanospora similis* v. H. n. sp. is described from branches of *Cornus sanguinea.* It resembles greatly *M. theleboloides* (Fckl.) Wint. A short discussion is given of *Amphisphaeria sapinea* Karsten (syn. *A. dolioloides* Rehm). *Sphaeria mutabilis* Pers. is transferred to Enchnosphaeria and is described in detail under the name *E. mutabilis* (Pers.) v. H. The genus and species *Trichocollonema Acrotheca* v. H. previously described are here shown to be invalid and are withdrawn. The species described is probably *Zignoëlla macrospora* Sacc. *Aposphaeriella gregaria* Diedicke is shown to be the imperfect stage of *Zignoëlla* (*Zignoina*) *pygmaea* (Karst.) Sacc. The ascigerous stage of *Pestalozzia truncata* Léveillé is probably *Ceratostoma Vitis* Fuckel. This conclusion and other similar ones recorded here are based on the examination of material, not on the results of cultures. Appended to the paper is a complete alphabetical list of all the fungi mentioned.—*H. M. Fitzpatrick.*

1112. Höhnel, Franz V. **Fragmente zur Mykologie XX. Mitteilung. Nr. 1031 bis 1057 [Mycological Fragments XX. 1031–1057]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 353–399. *Fig. 1.* 1917.—A new genus, Discosphaerina v. H., regarded as closely related to Guignardia, is founded on a hitherto undescribed species occurring on the leaves of *Solidago virgaurea.* The species, *D. discophora* v. H., differs from speces of Guignardia in lacking a definite ostiolum, and in the peculiar structure of the perithecial wall. *Mycosphaerella tar-*

diva Sydow, originally described from immature specimens, is here redescribed in detail from a recent collection of well developed material. *Sphaeria tosta* Berk. & Br., *Sphaerella Fuckelii* Pass., and *Sphaeria tritorulosa* Plowr. are found to be identical, and are discussed under the name *Didymella tosta* (Berk. & Br.) Sacc. *Gnomonia riparia* Niessl is believed to be also this species. *Didymella drymeia* v. H. is described as new from *Carex drymeia*, and the pycnidial stage, *Phyllosticta drymeia* v. H., is referred to the Sclerophomeae. *Massariopsis macrosporella* v. H. on dead twigs of *Acer campestre* is described as new. A new genus, *Cryptophaeella* v. H., is founded on *Coniothyrium Heteropatellae* v. H. This genus is referred to the Sclerophomeae and is characterized by the absence of definite conidiophores and by the parasitic habit. The pycnidia occur inside the perithecia, apothecia, and pycnidia of other fungi. *Diplodiella Angelicae* Diedicke is shown to have been founded on immature perithecia of Leptosphaeria Doliolum (P.) parasitized by *Didymosphaeria conoidea* Niessl and the species is discarded. The original description of *Metasphaeria Lonicerae* Fautrey having been prepared from poorly developed material, the species is here redescribed from a recent collection of mature material. *Byssothecium circinnans* Fuckel is regarded as the ascigerous stage of *Phoma roseola* Desm. and the synonomy of the species is discussed. *Leptosphaeria Calami* Karsten, *L. Acori* K., *L. acorella* Cooke, and *L. densa* Bres. are shown to be identical, and the binominal *L. Calami* Karsten being the oldest is retained for the species. *Leptosphaeria juncina* (Auersw.) and *L. juncicola* Rehm. are regarded as closely related to *L. Calami* K. and the three species are, according to Von Höhnel, probably in reality more properly referred to the genus Scleroplcella v. H. of the Pseudophaeriaceae. *Asterosporium Hoffmanni* Kunze is shown to be the conidial condition of *Massaria macrospora* (Desm.) Sacc. and the new genus, Asteromassaria, is based on the species. *Sphaeria hirta* Fries is transferred to the genus Karstenula, and is discussed as *K. hirta* (Fr.) v. H. The conidial stages of this and a related species, *K. rhodostoma* (A. & S.) Speg., are discussed and the synonomy given. A new genus, Plagiostromella v. H., is founded on *Pl. pleurostoma* v. H. on *Sapidus* sp. in Japan. A detailed description of the species is given accompanied by text figures. The genus is of doubtful position. The fruitbody is pluri-locular, has a definite ostiolum, and bears its asci laterally. The species resembles a Phyllachora superficially but seems to be nearer the Sphaeriaceae or the Clypeosphaeriaceae. It is suggested that the genus be made the basis of a new family, the Plagiostromellaceae v. H. *Sphaeria Scrophulariae* Desm., given by Saccardo as a species of Leptosphaeria, is here transferred to Pleospora and is called *Pl. Scrophulariae* (Desm.) v. H. *Cucurbitaria Hendersoniae* Fuckel incorrectly placed by Saccardo in Melanomma is here transferred to Gibberidea as *G.* Hendersoniae (Fckl.) v. H. *Cucurbitaria protracta* Fuckel and *C. acerina* Fuckel are shown to be identical and the first name is retained. The synonomy of the conidial stage is discussed. *Otthiella Aesculi* v. H. is described as new and the conidial stage is described under the name *Pyrenochaeta Aesculi* v. H. The fungus is, however, stated to be possibly merely an immature Cucurbitaria. Nitschkia Otth. 1869 is shown to equal Winterella Berl. 1894 and Winterina Sacc. 1899. A new genus Apioporthe v. H. is founded on *Diatrype anomala* Pk., the species being cited as *Ap. anomala* (Pk.) v. H. The genus is closely related to Diaporthe but differs in having a Diatrype-like stroma sunken in the bark, with parallel perithecial necks, and with the cells of the spore unequal. *Sphaeria virgultorum* Fr. is regarded as another species of Apioporthe and is cited as *Ap. virgultorum* (Fr.) v. H. *Melanconis tiliacea* Ellis is transferred to the genus Diaporthe. *Calospora occulta* Fuckel is transferred to Diapothe and cited as *D. abnormis* v. H., the name *D. occulta* being preoccupied by *D. occulta* (Fuckel) N. *Valsa sorbicola* Nitschke is shown to be a Diaporthe, and a detailed discussion of the various species of Diaporthe which occur in Central Europe on Prunus, Sorbus, Pirus and related genera is given. *Diaporthe dolosa* Sacc., *D. personata* (C. & E.), *D. oncostoma* (Duby) Fuckel, and *D. fasciculata* Nitschke, all of which occur on *Robinia Pseudoacacia*, are shown to be one species and the name *D. oncostoma* (Duby) Fuckel is retained for it. Moreover the pycnidial fungi, *Phomopsis oncostoma* (Thüm) v. H. and *P. pseudoacaciae* (Sacc.) v. H. are shown to be the same species, the former name being retained. *Diaporthe leiphaemia* (Fr.) and *D. dryophila* Niessl are shown to be identical. *Sphaeria apiculata* Wallroth, described by Fuckel, is shown to be a Gnomonia and is cited as *G. apiculata* (Wallroth-Fuckel) Winter. *Diaporthe Spina*

Fuckel is the same fungus. Appended to the paper is a complete alphabetical list of all the fungi mentioned.—*H. M. Fitzpatrick.*

1113. Holden, M. S. **A scheme suggested for the investigation of marine bacteria.** Jour. Marine Biol. Assoc. United Kingdom 12: 136–140. 1919.—Briefly suggests methods for studying marine bacteria in cultures of blood-glucose-agar, trypsin-agar, trypsin-broth, and on slides prepared therefrom, using silver nitrate, etc. as staining agents.—*G. J. Peirce.*

1114. Jahn, E. **Myxomycetenstudien. [Myxomycete studies.]** Ber. Deutsch. Bot. Ges. 36: 660–669. 1918.—The paper contains notes on the occurrence and morphological features of the following rare forms: *Ceratiomyxa caesia* sp. n., *Badhamia versicolor* Lister, *Badhamia decipiens* Berkeley, *Badhamia ovispora* Raciborski, *Physarum straminipes* Lister, *Physarum sulfureum* Alb. and Schw., *Didymium tubulatum* sp. n., *Didymium Trochus* Lister, *Leptoderma iridescens* G. Lister, *Licea singularis* sp. n., *Liceopsis lobata* Torrend, *Hemitrichia Karstenii* Lister, *Perichaena pedata* Lister ?—*Ernst Artschwager.*

1115. Kauffman, C. H. **The Agaricaceae of Michigan.** Michigan Geol. Biol. Survey Publ. 26 (Biol. Ser. 5): *Vol. 2, 10 p. Pl. 1–172.* 1918—Excellent heliotype plates from photographs by the author.—See Bot. Absts. 2, Entry 627.—*E. A. Bessey.*

1116. King, A. M. **Notes on the genus Balansia.** South African Jour. Sci. 15: 670–673. *Pl. 25, fig. 1–4.* 1919.—A disease of the grass *Cynodon dactylon* is common near Pretoria. The affected plants are pale yellowish green and produce abnormal, long, erect shoots with short internodes and poorly developed leaves. The sclerotia of the causal fungus develop in the axils of the leaves, the asci and spores developing in December; the fungus belongs to the genus *Balansia* and is probably an undescribed species.—*E. M. Doidge.*

1117. Klebahn, H. **Aus der Biologie der Ascomyceten. (The biology of the Ascomycetes.)** Ber. Deutsch. Bot. Ges. 36: 47–62. *Fig. 1–7.* 1919.—The paper contains a general discussion of biological factors of various ascomycetes: ejection of ascospores, types of beaks of perithecia, relationship between the various conidial and ascogenous stages of forms such as Gnomonia, Gloeosporium, Mycosphaerella; parasitism; biological species among saprophytes and parasites. The author suggests that in the case of the form-genus Entomosporium the ascogenous stage should fall into a new genus "Entomopeziza" because of its peculiar conidia. The various conidal forms developed during the winter and known as Fusicoccum and Sporonema may be considered as adaptations to the host and climatic conditions only. Biological forms are developed by *Pseudopeziza ribis*, but in this case the forms are also distinguished by slight morphological differences. It is suggested that biological forms may also be developed among saprophytes. *Mycosphaerella punctiformis*, growing on Tilia, Quercus and Corylus show slight differences in pure culture; it is conceivable that the fungus may show preference to a certain substratum and, for example, may grow better on oak leaves than on the leaves of the linden.—*Ernst Artschwager.*

1118. Konrad, P. **Notes et observations concernant le Tricholoma tigrinum Sch. = T. pardinum Q. [Remarks on Tricholoma tigrinum Sch. = T. pardinum Q.]** Bull. Trimest. Soc. Mycolog. France 35: 143–146. *Pl. 7.* 1919.—In the discussion of *Tricholoma tigrinum* the author gives a detailed description of the fungus, its geographical distribution, and furthermore states that the fungus is oftentimes confused with several species of the group *Tricholoma terreum*: which are edible; while *Tricholoma tigrinum* is poisonous.—*Fred C. Werkenthin.*

1119. Lakon. [Rev. of: Lüdi, Werner. **Puccinia petasiti-pulchellae nov. spec.** Centralbl. Bakt. II Abt. 48: 76–88. *2 fig.* 1917.] Zeitschr. Pflanzenkrankh. 29: 63. 1919.—Haploid phase on *Petasites niveus*, *P. albus*, and *P. hybridus* (pycnia and aecia). Diploid phase on *Festuca pulchella* (uredo). *Poa alpina* and *P. nemoralis* are also hosts. *Puccinia petasiti-pulchellae* is biologically not identical with *P. poarum*. The aecia of P. *poarum* do not affect *Festuca pulchella*. Detailed description and Latin diagnosis.—*H. T. Güssow.*

1120. Levine, Michael. **Life history and sexuality of Basidiomycetes.** [Rev. of: Bensaude, Mathilde. **Recherches sur le cycle évolutif et la sexualité chez les Basidiomycétes.** *156 p., 13 pl., 30 fig.* Nemours, 1918. (See also Bot. Absts. 3, Entry 347.)] Bot. Gaz. 68: 67–68. 1919.

1121. Levine, Michael. **Sexuality in the Basidiomycetes.** [Rev. of: Bensaude, Mathilde. **Recherches sur le cycle evolutif et la sexualité chez les Basidiomycétes.** *156 p., 13 pl., 30 fig.* Nemours, 1918.] Mycologia 11: 280–283. 1919.—Miss Bensaude's claim that fusion takes place between two cells coming from two different mycelia as a result of which secondary mycelium is produced, consisting of binucleate cells with clamp connections and which is capable of producing the fruiting body, does not seem to the reviewer to have been fully substantiated. "Her figures are undoubtedly faithful representations of her preparations, but her interpretations are not adequately supported."—*H. R. Rosen.*

1122. Lister, Gulielma. **Mycetozoa seen during the visit of the British Mycological Society to Shrewsbury, September 24th to 29th, 1917.** Trans. British Mycol. Soc. 6: 15–17. 1918.—A list of species with critical notes in some cases.—*H. M. Fitzpatrick.*

1123. Lister, Gulielma. **Mycetozoa found during the Selby foray.** Trans. British Mycol. Soc. 6: 88–91. 1918.—A total of fifty-two species is given. Critical notes call attention to the more unusual and interesting collections.—*H. M. Fitzpatrick.*

1124. Maire, Rene. **Remarques sur la variation d'une Agaricacée sous l'influence du milieu. [Remarks on the variation of an Agaricus due to the influence of its substratum.]** Bull. Trimest. Soc. Mycolog. France 35: 147–149. *1 fig.* 1919.—The author mentions the collection of *Rhodopaxillus nudus*, which was found growing in the midst of some *Agaricus campestris* in a substratum quite different from the ones on which we expect to find it. The change in substratum had caused various changes in the structure of this mushroom.—*Fred C. Werkenthin.*

1125. Matouschek. [Rev. of: Major, Eug. **Mèlanges mycologiques. Vermischtes über Pilze. (Miscellaneous mycological notes.)** Bull. Soc. Neuchâteloise Sci. Nat. 41: 40–43. 1913–16. Neuchâtel, 1917.] Zeitschr. Pflanzenkrankh. 29: 61. 1919.—New fungi:—*Uromyces caricis Rafflesianae* on *Carex Rafflesiana.* var. *continua* Keck., and *Uredo digitariae ciliaris* on *Digitaria ciliaris* Pers.; both on material from the Philippines. [See next following Entry, 1126.]—*H. T. Güssow.*

1126. Matouschek. [Rev. of: Major, Eug. **Notes mycologiques. Bemerkungen über Pilze. (Mycological notes.)** Bull. Soc. Neuchâteloise Sci. Nat. 31: 17–31. 1913–16. Neuchâtel. 1917.] Zeitschr. Pflanzenkrankh. 29: 60. 1919.—New for region, *Phytophthora erythroseptica* Pethybr. on potatoes. [See next preceding Entry, 1125.]—*H. T. Güssow.*

1127. McCallum, A. W. **The occurrence of Bulgaria platydiscus in Canada.** Mycologia 11: 293–295. *Pl. 14.* 1919.—The peculiar apothecia of *Bulgaria platydiscus* Casp., (*Sarcosoma globosum* var. *platydiscus* Casp.), are described. In attempting to germinate the ascospores it was found that the percentage of germination was very much higher on Czapek's agar than on potato agar and suggests the use of the former medium for spore germination in other related fungi.—*H. R. Rosen.*

1128. McKinney, H. H. **Nomenclature of the potato scab organism.** Phytopath. 9: 327–329. 1919. The writer studied three strains of potato scab organisms all pathogenic upon potato and all of which produced characteristic pigmentation on gelatin and agar media. These differed slightly in virulence and pigment formation but were considered identical with the scab fungus described by Drechsler and therefore to be given the binomial *Actinomyces scabies* (Thax.) Güssow and classed among the Hyphomycetes in the family Mucedinaceae.—*Maude Miller.*

1129. Mello, F. de, and J. F. St. Antonio Fernandes. **Révision des champignons appartenant au genre Nocardia. [Revision of the fungi belonging in the genus Nocardia.]** Mem. Asiatic Soc. Bengal 7: 103–138. 1919.—This paper includes a synopsis of about 90 species, a few of which are described as new, the occurrence of each species in nature, synonyms, and a resume of the biological and cultural characters of each.—*E. D. Merrill.*

1130. Moreau, F. M., and Mme. Moreau. **Recherches sur les lichens de la famille Peltigeracées. [Researches on the lichens of the family Peltigeraceae.]** Ann. Sci. Nat. Bot., X. 1: 29–32. 1919.—Authors propose to publish on (1) the fungi that enter into the formation of the lichens; (2) the algal symbionts; (3) a study of the complex resulting from their association. [Only the introduction printed in this number.]—*J. P. Kelly.*

1131. Moreau, Fernand. **Notions de technique microscopique.—Application à l'étude des champignons. [Rudiments of microscopical technique. Its application to the study of fungi.]** Bull. Trimest. Soc. Mycolog. France 34: 137–191. *Fig. 1–35.* 1919.—Chapter I gives detailed descriptions of how to use the microscope. Chapter II takes up methods of microscopical study of fungi. Chapter III gives methods for the study of nuclei of fungi. The last chapter takes up the microscopical technic for the study of the protoplasm of fungi. —*Fred C. Werkenthin.*

1132. Murrill, W. A. **Dr. William Gilson Farlow.** Mycologia 11: 318. 1919.

1133. Murrill, W. A. **Collecting fungi in Virginia.** Mycologia 11: 277–279. 1919.—Notes on various woody and fleshy fungi observed during July are presented. Mention is made of a leaf-spot of *Acer negundo* and *A. platanoides*, and a blackening and decay of fruit of *Juglans regia.* [See Bot. Absts. 3, Entry 2709.]—*H. R. Rosen.*

1134. Murrill, W. A. **Illustrations of fungi XXXI.** Mycologia 11: 289–292. *Pl. 13 (colored).* 1919.—Technical descriptions, critical notes and colored illustrations of *Cortinarius alboviolaceus* (Pers.) Fries, *Pholiota squarrosoides* Peck and *Melanoleuca Russula* (Scop.) Murrill, (*Tricholoma Russula* Gill.), are presented.—*H. R. Rosen.*

1135. Murrill, W. A. **Some described species of Poria.** Mycologia 11: 231–244. 1919. —Thirty-five white and bright-colored North American species of *Poria* are presented together with synonyms, original descriptions, distributions and critical notes. The following new names or new combinations are proposed, *Poria humilis* nom. nov., *P. elachista* (Berk.) comb. nov. and *P. subsulphurea* (Ellis & Ev.) comb. nov.—*H. R. Rosen.*

1136. Murrill, W. A. **A polypore parasitic on twigs of Asimina.** Mycologia 11: 319. 1919.—*Inonotus amplectens* is now known to be parasitic on twigs of three species of *Asimina*: *A. parviflora*, *A. pygmaea*, and *A. angustifolia.*—*H. R. Rosen.*

1137. Murrill, W. A. **An orange-colored puffball.** Mycologia 11: 319–320. 1919.—The rare *Calvatia* (*Lycoperon*) *rubroflava* was collected in a dahlia bed of the New York Botanical Garden. Cragin's description of this species is copied and the fact noted that the New York plant is larger than those described by Cragin, measuring $3\frac{1}{2}$ inches broad and nearly 3 inches high.—*H. R. Rosen.*

1138. Murrill, W. A. **Boleti from Connecticut.** Mycologia 11: 321–322. 1919.—A number of boleti collected by H. L. Wells are listed and his description of *Boletus Gertrudiae* Peck presented.—*H. R. Rosen.*

1139. Northrop, J. H., L. H. Ashe, and J. K. Senior. **Biochemistry of Bacillus acetoethylicum [sp. nov.] with reference to the formation of acetone.** Jour. Biol. Chem. 39: 1–21. 1919.—See Bot. Absts. 3, Entry 2890.

1140. Overholts, L. O. **Some Colorado fungi.** Mycologia 11: 245-258. 1919.—The author lists 11 species of Ascomycetes of three different orders and 141 species of Basidiomycetes, most of which are fleshy or woody forms.—*H. R. Rosen.*

1141. Patouillard, N. **Sur deux formes conidiennes de Porohydnés. [Two types of conidia of Polyporus and Hydnum.]** Bull. Trimest. Soc. Mycolog. France 34: 198-201. *Fig. 1-2.* 1919.—The author describes the formation of conidia on *Ptychogaster nodulosus* and *Echinodia Theobromae.*—*Fred C. Werkenthin.*

1142. Paul, David. **Presidential address. On the earlier study of fungi in Britain.** Trans. British Mycol. Soc. 6: 91-103. 1918.—This is a detailed discussion of the rise of mycology in Great Britain from the earliest times down to the day of Berkeley. The first notice of fungi in the English language is regarded as that published in 1516 in the Greate Herball. No attempt is made to follow the advance in the study of mycology outside of the British Isles, but the influence of Fries is mentioned. All of the earlier workers are discussed in chronological order, and the various steps in the evolution of the subject are clearly shown. —*H. M. Fitzpatrick.*

1143. Pavarino, G. L. **Alcune malattie delle orchidee causate da bacteri. [Some bacterial diseases of orchids.]** Atti Ist. Bot. Univ. Pavia 2, 15: 81-88. *Pl. 13.* 1918.—See Bot. Absts. 3, Entry 2724.

1144. Pavarino, G. L., and M. Turconi. **Sull 'avvizzimento delle piante di Capsicum annuum L. [A wilt of Capsicum annum.]** Atti Ist. Bot. Univ. Pavia 2, 15: 207-211. 1918.—See Bot. Absts. 3, Entry 2723.

1145. Pearson, A. A. **On two-spored basidia and other matters.** Trans. British Mycol. Soc. 6: 39-46. 1918.—The tendency of students of the fleshy basidiomycetes to ignore microscopic characters is pointed out and deplored. The occurrence of bi-spored species is especially emphasized. Also the importance of studying the cystidia, and of making careful drawings of these and the spores is discussed. A brief review of the literature is given from this standpoint.—*H. M. Fitzpatrick.*

1146. Pearson, A. A. **A new Mycena.** Trans. British Mycol. Soc. 6: 135-136. 1919.—*M. epipterygioides* n. sp. regarded as related to *M. epipterygia* (Scop.) Fr. but provided with peculiar finely ciliated brush-like cystidia and with a greenish yellow pileus.—*H. M. Fitzpatrick.*

1147. Pelé. **Note sur Aleuria Ricciae Crouan = Lachnea Ricciae Gillet. [Remarks on Aleuria Ricciae Crouan = Lachnea Ricciae Gillet.]** Bull. Trimest. Soc. Mycolog. France 35: 150, 151. 1919.—The author mentions the collection of *Aleuria Ricciae* on *Riccia glauca* in 1918, a fungus, which was omitted in the classification of European Discomycetes by Boudier. The author lists the description of this fungus by Crouan and adds to this his personal observations.—*Fred C. Werkenthin.*

1148. Petch, T. **Mocharas and the genus Haematomyces.** Ann. Botany 33: 405-419. *2 fig.* 1919.—*Haematomyces spadiceus* was described by Berkeley and Broome, in 1873, as a new genus of fungi from Ceylon. The author finds that this is not a fungus at all but a gum-like exudation, called Mocharas in Ceylon, from wounded or, more commonly, felled *Bombax malabaricum.* The old genus thus falls, but the author prefers to retain *Haematomyces* emended, for species subsequently described by Peck and others. According to his new conception of the genus, it should be placed in the Helvellaceae, and not in the Bulgarieae. A new species, *H. carneus*, is described.—*E. W. Olive.*

1149. Petch, T. **Revisions of Ceylon fungi, Part VI.** Ann. Roy. Bot. Gard. Peradeniya 7: 1-41. 1919.—A continuation of the series previously published in the same periodical,

being critical notes on, reductions of, and redescriptions of Ceylon fungi, numbers 215 to 272, originally described by Berkeley and Broome from the Ceylon collections made by Thwaites.—*E. D. Merrill.*

1150. Petch, T. **Gasteromycetae zeylanicae.** Ann. Roy. Bot. Gard. Peradeniya 7: 57-78. 1919.—A list of the Ceylon *Gasteromycetes* in which the following new combinations or new species occur: *Jansia proxima* (B. & Br.) Petch, *Nidularia reticulata* n. sp., *Mitremyces insignis* (Berk.) Petch, *M. Berkeleyi* (Mass.) Petch, *Lanopila bicolor* (Lév.) Petch, *Calvatia Gardneri* (Berk.) Petch, *Bovistella conspurcata* (B. & Br.) Petch, *Scleroderma endoxanthum* n. sp. *S. pseudotipitatum* n. sp., and *Lycogalopsis zeylanica* n. sp. *Pharus* is described as a new genus, its type being *P. Gardneri* Petch, based on *Lysurus Gardneri* Berk.; this name is invalidated by *Pharus* P. Br., a valid genus of the *Gramineae.*—*E. D. Merrill.*

1151. Petch, T. **Further notes on Colus Gardneri (Berk.) Fischer.** Trans. British Mycol. Soc. 6: 121-132. *Pl. 5.* 1919.—A detailed account of the controversy which has resulted from the study of this species by Fischer, Lloyd and others. The characters of the genera Colus, Lysurus, Anthurus, etc. are discussed in this connection. Fresh material of *Colus Gardneri* collected in Ceylon is compared with material of *Lysurus australiensis* received in formalin from Australia, and the essential points of difference are enumerated. Finally a new genus, *Pharus*, is based on the species from Ceylon. In this genus the arms of the receptaculum are described as being normally united at the apex, and the glebiferous layer, borne solely on the arms, consists of numerous plicate processes and plates standing perpendicular to the arm and presenting a granular outer surface. The Australian species is retained in Lysurus. The two forms are figured.—*H. M. Fitzpatrick.*

1152. Pethybridge, G. H. **Notes on some saprophytic species of fungi, associated with diseased potato plants and tubers.** Trans. British Mycol. Soc. 6: 104-120. *Pl. 3, 4.* 1919.—A species of Nectria, found in close association with *Verticillium cinnabarinum* Reinke and Berth., is shown by pure cultures to be the perfect stage of this species, and is described as *Nectria inventa* n. sp. Hallier attributed the disease of potatoes known as "Curl" to the presence of a fungus which he named *Rhizoctonia tabifica* n. sp. He placed the fungus in Rhizoctonia because he found in connection with it black, pseudo-parenchymatous bodies which he regarded as sclerotia. These bodies are here shown to be the fruit bodies of a species of Colletotrichum and a new species, *C. tabificum* (Hallier pro parte) Pethybridge is described from them. Although it is recognized that the species may be identical with *C. solanicolum* O'Gara, certain differences are pointed out, especially the development by *C. tabificum* of an amethystine fluorescence in the culture medium. Taubenhaus has described a new species of Colletotrichum which he regards as identical with *C. solanicolum* and applies to it the name *C. atramentarium* since he regards it as identical with *Phellomyces sclerotiophorus* Frank and this in turn to *Vermicularia atramentaria* B. & Br. Pethybridge here points out the fact that *Spondylocladium atrovirens* Harz, the fructifying stage of *P. sclerotiophorus* Frank, as it occurs in Europe cannot be regarded as a species of Colletotrichum. The possibility of the identity of *C. tabificum* and *C. varians* Ducomet is also mentioned. A study of *Hypomyces Solani* Reinke and Berth. in pure culture shows that it produces conidia and chlamydospores resembling in some respects those produced by species of Fusarium. There are, however, pronounced differences between typical species of Fusarium and the conidial stage of this Hypomyces, and it is concluded that *H. Solani* is not the perithecial stage of *Fusarium Solani* or of any other species of Fusarium. It is shown, moreover, that *H. Solani* is not parasitic on the potato. Two new species of Verticillium isolated from the surface of potato tubers are described and compared with *V. albo-atrum* R. & B. Both were studied in pure culture derived from single conidia and inoculations on the potato were in all cases unsuccessful. The names applied are *V. nubilum* n. sp., and *V. nigrescens* n. sp. *Langloisula macrospora* A. L. Smith was isolated from potato leaves and tubers. Reasons are given for the belief that it is identical with Monopodium Delacroix and with *Acromoniella atra* Corda. All of the fungi discussed are figured.—*H. M. Fitzpatrick.*

1153. Putterill, Victor Armsby. **Notes on the morphology and life history of Uromyces Aloes Cke.** South African Jour. Sci. 15: 656–662. *Pl. 22–23, fig. 1–6.* 1919.—This is a brief account of the common rust attacking various species of *Aloe* in South Africa. A study was made of the cytological development of the teleutospore, which is similar to that of other *Uredineae.* The occurrence of spermogonia is noted for the first time; the nuclei of the spermatia occupy about one third of the diameter of the spore. The teleutospores germinate readily, but under no circumstances were sporidia obtained. The mode of entrance of the fungus into the host was not ascertained. From the characters of the basidium of spores from various species of *Aloe*, it would seem that biological, if not true morphological varieties of this fungus exist; this may account in part, for the comparative immunity of some species of *Aloe* growing in close proximity to badly diseased plants of other species.—*E. M. Doidge.*

1154. Ranoévitch, N. **Sur une nouvelle espèce de Rouille, Puccinia Corteyi Ran. [A new species of rust, Puccinia Corteyi Ran.]** Bull. Trimest Soc. Mycolog. France 35: 140–141. *1 fig.* 1919.—The author reports the collection of a rust on *Heracleum minimum*, a new species and names it *Puccinia Corteyi* after Cortey who collected the specimens in 1917.—*Fred C. Werkenthin.*

1155. Raunkiaer, C. **En ny Tulasnella-Art samt bemaerkninger om Tulasnella's systematiske Stilling. [A new species of Tulasnella with remarks on the systematic position of the genus Tulasnella.]** Bot. Tidskr. 36: 204–209. *Fig. 1.* 1918.—A description is given of *Tulasnella helicospora* n. sp. which forms a rather insignificant gray colored coating on moist damp leaves, but later becomes more significant. A critical discussion is presented upon the position of the genus *Tulasnella.*—*A. L. Bakke.*

1156. Rea, Carleton. **The Shrewsbury Foray, 24th–29th September, 1917, and a complete list of the fungi gathered during the foray.** Trans. British Mycol. Soc. 6: 1–14. 1918.—A discussion of the important events associated with the foray includes the mention of interesting species collected.—*H. M. Fitzpatrick.*

1157. Rea, Carleton. **New or rare British fungi.** Trans. British Mycol. Soc. 6: 61–64. *Pl. 2.* 1918.—*Lepiota fulvella* n. sp., *L. rosea* n. sp., and *Clavaria cinerea* (Bull.) Fr. var. *gracilis* n. var. are described and figured in colors. Notes are given on *Boletus lacteus* Lév., *Clavaria rugosa* (Bull.) Fr. var. *fuliginea* Fr., *C. chionea* (Pers.) Quél., *Geaster triplex* Jungh., *Cyathipodia villosa* (Hedw.) Boud., *Humaria tetraspora* [Fckl.) Boud., *Dermatea umbrina* Cke. & Massee, and *Antromyces copridis* Fresen.—*H. M. Fitzpatrick.*

1158. Scalia, G. **Sull'Ascochyta pisi Lib. [On Ascochyta pisi Lib.]** Staz. Sper. Agric. Ital. 51: 228–242. *Pl. 8, fig. 1–3.* 1918.—From the study of abundant material of *Ascochyta pisi* on beans and peas, examination of exsiccati specimens, and comparison of the diagnoses of several *Ascochyta* species on *Phaseolus* and *Vicita* (*A. fabae* Speg., *A. boltshauseri* Sacc., *A. viciae* Lib., *A. vicicola* Sacc., *A. viciae-pisiformis* Bubak, and *A. viciae-lathyroides* Syd.), the author concludes that the species last named may be regarded as mere forms or varieties of *Ascochyta pisi.* Since the morphological characters are extremely variable, the dimensions of the pycnidia differing in specimens collected from the same plant, and the form and dimensions of spores varying in a single pycnidium, separation into distinct species on the basis of these characters is not justifiable.—*E. K. Cash.*

1159. Schoeners, T. H. C. **De tomatenkanker, een voor Nederland ernstige tomatenziekte. [Tomato canker: a serious disease in Holland.]** Tijdschr. Plantenz. 25: 174–192. *Pl. 3–5.* 1919.—See Bot. Absts. 3, Entry 2754.

1160. Smith, Annie Lorrain. **Presidential address. The relation of fungi to other organisms.** Trans. British Mycol. Soc. 6: 17–31. 1918.—A brief discussion of some of the well known phenomena of parasitism and symbiosis, with emphasis on the conditions in the lichens. A bibliography of 31 references is given.—*H. M. Fitzpatrick.*

1161. Smith, Annie Lorrain. **Lichenology, a new departure.** Trans. British Mycol. Soc. 6: 32. 1918.—A brief mention of the importance of the inclusion of this subject in the field of mycology in Great Britain.—*H. M. Fitzpatrick.*

1162. Smith, Annie Lorrain. **Hyphomycetes and the rotting of timber.** Trans. British Mycol. Soc. 6: 54–55. 1918.—*Torula abbreviata* Corda, *Haplographium finitimum* Sacc., and *Verticillium tenuissimum* Corda were found in rotting structural timbers.—*H. M. Fitzpatrick.*

1163. Smith, Annie Lorrain. **Worthington G. Smith as mycologist.** Trans. British Mycol. Soc. 6: 65–67. 1918.

1164. Smith, Annie Lorrain. **New or rare microfungi.** Trans. British. Mycol. Soc. 6: 149–157. 1919.—The genus Boydia, evidently a member of the Mycosphaerellaceae, is based on a new species, *B. remuliformis*, found on decaying stems of *Ilex angustifolia.* The spores are peculiar in being constricted at the middle and in having both ends clavate. They are elongated, one-septate, curved, and hyaline. The asci are 8-spored and aparaphysate. The following new species are described: *Melogramma elongatum*, A. L. S. on decaying wood, *Sphaerulina Alni* A.L.S. on bark of Alnus, *Phyllosticta Hydrocotyles* A.L.S. on leaves of *H. vulgaris*, *Leptothyrium Fragariae* A.L.S. on leaves of *Fragaria vesca*, and *Coremium Swantonii* A.L.S. on *Vespa sylvestris*, a wasp. About 40 additional fungi, unusual in the British Isles, are listed with critical notes. These forms are chiefly pyrenomycetes and fungi imperfecti.—*H. M. Fitzpatrick.*

1165. Smith, Annie Lorrain, and J. Ramsbottom. **New or rare microfungi.** Trans. British Mycol. Soc. 6: 47–53. 1918.—A new genus of the discomycetes, *Discocera*, is founded on *D. lichenicola* n. sp., collected in Somerset on the thallus of a lichen. The genus resembles Humaria in its spore characters but has inoperculate asci, and its paraphyses branch to form a dense epithecium. Its affinity to the lichenicolous genus Nesolechia is suggested. *Amerosporium patellarioides* n. sp., on leaves of *Rosa canina*, *Ramularia umbrosa* n. sp. on living leaves of *Saxifraga umbrosa*, and *Volutella longepila* n. sp. on branches of *Ulix europae* are described. Notes on nearly 20 unusual species of various groups are given.—*H. M. Fitzpatrick.*

1166. Smith, Erwin F., L. R. Jones, and C. S. Reddy. **The black chaff of wheat.** Science 50: 48. 1919.—The continued prevalence of black chaff of wheat in the United States makes it desirable to apply a Latin-scientific name to the bacterial organism causing the disease. Certain minor differences between this organism and the bacterial blight of barley are pointed out, and it is suggested that the black chaff organism, for the present at least, be distinguished as *Bacterium translucens*, var. *undulosum.* A description of the organism follows. —*A. H. Chivers.*

1167. Smith, Erwin F., and Lucia McCulloch. **Bacterium solanacearum in beans.** Science 50: 238. 1919.—See Bot. Absts. 4, Entry 1354.

1168. Speare, A. T. **The fungus parasite of the periodical Cicada.** Science 50: 116–117. 1919.—See Bot. Absts. 4, Entry 1361.

1169. Speare, A. T. **On certain entomogenous fungi.** Mycologia 12: 62–76. *Pl. 3–5.* 1920.—The genus *Hirsutella* of Patouillard is discussed and redescribed. *H. entomophila*, *H. saussurei* (Cooke) comb. nov., *H. floccosa* sp. nov., *H. citriformis* sp. nov., and *H. fusiformis* sp. nov. are the species described in this genus. *Synnematium Jonesii* gen. et sp. nov. is also described. All the forms are illustrated.—*H. R. Rosen.*

1170. Stevens, F. L., and Nora Dalby. **Some Phyllachoras from Porto Rico.** Bot. Gaz. 68: 54–59. *3 pl.* July, 1919.—In addition to notes on other species, the following new species are reported: *Phyllachora banisteriae*, *P. bourreriae*, *P. canafistulae*, *P. drypeticola*, *P. gnipae*, *P. heterotrichae*, *P. mayepeae*, *P. metastelmae*, *P. nectandrae*, and *P. ocoteicola.*—*H. C. Cowles.*

1171. Taubenhaus, J. J. **Recent studies on Sclerotium rolfsii Sacc.** Jour. Agric. Res. 18: 127–138. *Pl. 3–6, fig. 1.* 1919.—See Bot. Absts. 4, Entry 1371.

1172. Tehon, Leo R. **Studies on some Porto Rican fungi.** Bot. Gaz. 67: 501–511. *1 pl.* 1919.—A description of some miscellaneous material from the collections of F. L. Stevens. In addition to notes on previously reported species, the following are described as new: *Meliola conferta, M. cestri, M. bayamonensis, M. marcgraviae, Phyllachora quadraspora, P. ischmaemi, Stigmatea guettardae, Phaeosphaerella paspali, Coniothyrium marisci, Pestalozzia lucumae, Acrothecium flacatum,* and *Trichostoma axonopi.—H. C. Cowles.*

1173. Turconi, Malusio, and Luigi Maffei. **Note micologiche e fitopatologiche. I.—Un nuovo genere di Ceratostomataceae. II—Due nuovi micromiceti parassiti della Sophora japonica Linn. [Mycological and pathological notes.]** Atti Ist. Bot. Univ. Pavia 2, **15**: 143–149. *Pl. 1.* 1918.—See Bot. Absts. 3, Entry 2773.

1174. Turley, H. E. **New fruit fungi found on the Chicago market.** Science 50: 375–376. 1919.—See Bot. Absts. 4, Entry 1372.

1175. Vincens, F. **Valeur taxonomique d'une particularité de la structure des ascospores chez les Xylariacées. [Taxonomic value of peculiarities of the structure of ascospores of Xylariaceae.]** Bull. Trimest. Soc. Mycolog. France **34**: 101–109. *Fig. 1–4.* 1919.—The author points out various peculiarities in the structures of ascospores of Xylariaceae which simplify the classification of these fungi. The following fungi are discussed: *Xylaria polymorpha, Xylaria Hypoxylon, Hypoxylon fuscum, Ustulina vulgaris, Xylaria hippotrichoides, Thamnomyces hippotrichoides, Rhizomorpha tuberculosa, Daldinia concentrica, Poronia punctata, Nummularia discreta, Rosellinia Julii, Anthostoma atropunctatum, Anthostoma targidum, Penzigia compuncta, Wawelia regia.—Fred. C. Werkenthin.*

1176. von Höhnel, F. **Über discomyceten vortäuschende Microthyriaceen. [Microthyriaceae resembling and mistaken for Discomycetes.]** Ber. Deutsch. Bot. Ges. **36**: 465–470. 1918.—*Micropeziza scirpicola* Fuckel and *Discomycella tjibodensis* v.H., formerly considered true Discomycetes, belong to the Microthyriaceae. *Belonidium aurantiacum* Rehm forms the characteristic shield of the Microthyriaceae, but develops also a parenchymatous excipulum thereby constituting a transition form to the few Discomycetes which are related to the Helotiaceae. The new genera *Calycellina* and *Cenangina,* together with the three forms above mentioned, would constitute a natural group the first members of which must still be considered as belonging to the Microthyriaceae, while the last members are typical Discomycetes. *Micropeziza scirpicola* Fuckel and *Belonidium aurantiacum* Rehm are closely related and differ only in the development of the excipulum. Both are to be included in the new genus *Niesslella* of the Microthyriaceae.—*Ernst Artschwager.*

1177. von Höhnel, F. **Über den Zusammenhang von Meliola mit den Microthyriaceen. [Relation of Meliola to the Microthyriaceae.]** Ber. Deutsch. Bot. Ges. **36**: 471–473. 1918.—The perithecia of *Meliola* develop exactly as the perithecia of the Microthyriaceae, namely on the lower side of the subicular hyphae; there is no difference then, between a thyriothecium and a perithecium in *Meliola.* However, between the forms *Amazonia Psychotriae* and *Meliola corallina* there is a big gap. The former is a typical Microthyrium, while the latter is a true Meliola. An intermediate form is found in *Dimerosporium Litscae* P. Henn. which was described by Hennings as belonging to the Perisporiaceae. Sydow later put it in the new genus *Armatella.* However, *Armatella* does not develop a hypostroma as claimed by Theissen and Sydow, and the fruit body does not resemble *Polystomella* but the *Meliola* species which lack the spines of the fruit body. It is easy to understand why *Dimerosporium Litscae* was considered as belonging to the Microthyriaceae, since the description was based on unripe material and the juvenile stage of a *Meliola* is hardly distinguishable from members of the Microthyriaceae.—*Ernst Artschwager.*

1178. WAGER, HAROLD. **A fluorescent colouring matter from Leptonia incana Gill.** Trans. British Mycol. Soc. 6: 158–164. 1919.—Experiments show that this fungus contains two fluorescent coloring matters one yellow the other blue. These in combination give the plant a green color. A discussion of the phenomenon of fluorescence in fungi is accompanied by a list of species in which it occurs.—*H. M. Fitzpatrick.*

1179. WAKEFIELD, E. M. **Observations on the biology of some sand-dune fungi.** Trans. British Mycol. Soc. 6: 33–36. 1918.—The species *Psilocybe ammophila* Mont., *Coprinus Friesii* Quél., *Bolbitius tener* Berk., *Galera rubiginosa* Fr., *Inocybe dulcamara* Fr., and *Inocybe cutheles* B. & Br. are discussed. They were collected on the sand dunes on the Gower coast in South Wales. Field observations show that the mycelium of the fungi in some cases arises from buried leaves of dune plants. In the case of two species, however, the only apparent source of organic matter was a crust of humus formed from algae, chiefly Oscillaria. It is believed that careful observation will show the fungous flora of sand dunes to be extensive. —*H. M. Fitzpatrick.*

1180. WAKEFIELD, E. M. **The Selby foray, 9th–14th September 1918, and complete list of fungi gathered during the foray.** Trans. British Mycol. Soc. 6: 77–87. 1919.—A brief discussion of the interesting features of the foray is followed by a complete list of the fungi collected. A group picture showing the 33 members of the society who attended the foray accompanies the article.—*H. M. Fitzpatrick.*

1181. WAKEFIELD, E. M. **New British fungi.** Trans. British Mycol. Soc. 6: 132–134. 1919.—*Hypochnus umbrinus* (Fr.) Quél., *H. isabellinus* Fr., *Galactinia Howsei* Boud., *Helotium ciliatosporium* Boud., *Gloeosporium inconspicuum* Cav., and *Ramularia Barbaraeae* Pk. reported for the British Isles.—*H. M. Fitzpatrick.*

1182. WAKEFIELD, E. M. **Charles Ogilvie Farquarson.** Trans. British Mycol. Soc. 6: 236–237. 1919.

1183. WAKEFIELD, E. M., AND A. A. PEARSON. **Resupinate hymenomycetes from the neighborhood of Weybridge, Surrey.** Trans. British. Mycol. Soc. 6: 68–75. 1918.—*Tulasnella tremelloides* n. sp. is described and figured. *Protodontia uda* v. Hoehn., and a number of species of Corticium, Peniophora, Hypochnus, Coniophora, Odontia, Poria, etc., are cited with critical notes and figures. Six species and two genera are new to the British Isles. [See next following Entry, 1184.]—*H. M. Fitzpatrick.*

1184. WAKEFIELD, E. M., AND PEARSON A. A. **Additional resupinate hymenomycetes from the Weybridge district.** Trans. British Mycol. Soc. 6: 136–143. 1919.—Notes are given on collections of *Platygloea effusa* Schroet., and various species of Corticium, Peniophora, Hypochnus, Grandinia, Odontia, Radulum, Solenia, Merulius, Hydnum and Poria. No new species listed. [See next preceding Entry, 1183.]—*H. M. Fitzpatrick.*

1185. WAKSMAN, SELMAN A. **Studies in the metabolism of Actinomycetes. II.** Jour. Bact. 4: 307–330. 1919.—See Bot. Absts. 3, Entry 2860.

1186. WALKER, LEVA B. **Development of Pluteus admirabilis and Tubaria furfuracea.** Bot. Gaz. 68: 1–21. *8 fig., 5 pl.* 1919.—The basidiocarp primordium of *Tubaria* consists of loosely interwoven hyphae of uniform size; the primordium of *Pluteus* was not obtained. In *Tubaria* the development of the fruit body is endogenous, a well-defined blematogen surrounding it while young. In *Pluteus* the development is exogenous, and there is a strong epinastic development in the margin of the pileus; the gills originate as downward growing folds which develop centrifugally. In *Tubaria* the development is also centrifugal, the gills originating as radial folds in a previously uniform palisade layer. The cystidia of *Pluteus* are formed terminally on filaments similar to those that bear the smaller cells of the hymenial layer; these filaments eventually become branched. Upon the expansion of the trama of *Pluteus* large elongated cells from the subhymenium grow inward and downward, giving the

trama a very unusual appearance; these cells probably represent internal cystidia. In *Tubaria* the surface of the pileus is never clearly defined; the marginal veil, made up of two layers, is so delicate that it soon disappears. The cells of the young *Pluteus* basidiocarps are constantly binucleate.—*H. C. Cowles.*

1187. Wenner, John J., and Leo F. Rettger. **A systematic study of the Proteus group of bacteria.** Jour. Bact. 4: 331–353. 1919.—In this study eighty-four strains of the Proteus group were obtained. Various morphological and cultural tests were made upon the different strains and the following conclusions reached: The group may be divided into two genera, *Proteus* and *Zopfius*, the latter a new genus. Two species are included in the first, *P. vulgaris* and *P. mirabilis*, and one in the second, no name being suggested for this species.—*Chester A. Darling.*

1188. West, Erdman. **An undescribed timber decay of hemlock.** Mycologia 11: 262–266. 1919.—*Polyporus tsugae* (Murr.) Overholts is found to be a rot producer of dead hemlock timber. It attacks the sap and heart-wood destroying both cellulose and lignin. The fungus, which is fully described, is shown to be different from *P. lucidus* and *P. curtisii*.—*H. R. Rosen.*

1189. Wheldon, Harold J. **Observations on the fungi of the Lancashire and Cheshire sand-dunes.** Trans. British Mycol. Soc. 6: 143–148. 1919.—A considerable number of species of hymenomycetes, gastromycetes, and discomycetes are listed. The opinion is expressed that the roots and other buried remains of Agropyron and Ammophila provide the means of sustenance.—*H. M. Fitzpatrick.*

1190. Wilson, Malcolm. **Some British rust fungi.** Jour. Botany 57: 161–163. 1919.—In this journal, in 1915, an account was given of the occurrence of several alpine species of *Uredineae.* The present paper supplies additional information on some of these, and records the occurrence of several others. The uredo- and teleutospore stages of *Melampsora alpina* Juel occur on *Salix herbacca,* and the aecidial stage of *Saxfraga oppositifolia.* This stage has been known as *Cocoma Saxifragae* Went. A long description of this species is given. The discovery of the aecidial stage clears up any doubt at to the distinctness of this fungus from *Melampsora arctica* Rost. The aecidial stage of *Puccinia borealis* was discovered by Greville on Ben Voirlich in 1821, and has been the only recorded British station. It is now recorded from Ben Lui on *Thalictium alpinum.* Juel showed that the uredospore and teleutospore stages occur on *Argostis borealis. Authoxanthum orodatum* may be another host. Infection experiments are to be carried out to determine whether this species of grass is indeed another host. *Puccinia Polygoni-vivipari* Karst. was found on *Polygonium viviparum* in Perthshire in 1915. The uredo- and teleutospore stages of *P. septentrionalis* are also found on *Polygonium viviparum,* but at higher altitudes. The distinguishing marks of the two species are given. *P. Polygoni-vivipari* appears to be autoecious. *Uromyces Onobrychidis* Lev. was found in Kent in cultivated sanfroin. It has not previously been reported from Great Britain. The characters are given. Teleutospores had not been found in British specimens of *Puccinia Hypochaeridis* Oud. up to the present time. They were discovered, along with uredospores, on *H. radicata* at Epsom in 1916. *Puccinia Crepidis* Schrot. was found on *Crepis virens* in Perthshire in 1915. The aecidial stage of *P. uliginosa* Juel occurred on *Parnassia palustris* in Argyllshire in 1915. *P. major* Dietel was found on Ben Voirlich in 1915 in aecidial condition where it occurred on *Crepis paludosis.* A correction is made of spore measurements of *P. Prostii* given in Jour. Bot. 53: 44. 1915.—*K. M. Wiegand.*

1191. Wolf, Charles G. L. **Contributions to the biochemistry of pathogenic anaerobes. VI. The proteolytic action of Bacillus sporogenes (Metchinkoff) and Bacillus welchii.** Jour. Path. and Bact. 22: 270–288. 1919.—See Bot. Absts. 4, Entry 1524.

1192. Wolf, Charles G. L. **Contributions to the biochemistry of pathogenic anaerobes. VII. The biochemistry of Bacillus proteus.** Jour. Path. and Bact. 22: 289–307. 1919.—See Bot. Absts. 4, Entry 1551.

1193. Yasuda, Atsushi. **Zwei neue arten von Polyporus.** [Two new species of Polyporus.] Bot. Mag. Tokyo 33: 139–142. *4 fig.* 1919.—*Polyporus tsunodae* Yasuda, from the province Kozuke, and *Polyporus greeni* Yasuda, from the province Settsu, Japan.—*L. R. Abrams.*

1194. Yasuda, Atsushi. **Eine neue Arte von Coniophora.** [A new species of Coniophora.] Bot. Mag. Tokyo 33: 155–156. *1 fig.* 1919.—Grows on dead stems of *Pasania cuspidata*, in the province of Awaji.

1195. Yasuda, Atsushi. **Notes on fungi (85).** (In Japanese.) Bot. Mag. Tokyo 33: 54–55. 1919.—Refers to *Coniophora matsuzawae* Yasuda sp. nov., *Dermatea cerasi* (Pers) de Not., and *Xylaria obovata* Berk.—*L. L. Burlingame.*

1196. Yasuda, A. **Notes on fungi (87).** (In Japanese.) Bot. Mag. Tokyo 33: 112–114. 1919.—Refers to *Stereum boninense* = *Hymenochaete boninensis* Yasuda sp. nov.; *Hydnum violascens* Alb. et Schw.; and *Tomentella fusca* (Pers.) Schrot.—*L. L. Burlingame.*

1197. Yasuda, A. **Notes on fungi (88).** (In Japanese.) Bot. Mag. Tokyo 33: 140–141. 1919. Refers to *Polyporus greeni* Yasuda sp. nov.; *Stereum rimosum* Berk.; and *Clavaria amethystina* (Holmsk.) Bull.—*L. L. Burlingame.*

1198. Yasuda, A. **Notes on fungi (89).** (In Japanese.) Bot. Mag. Tokyo 33: 167–169. 1919.—Refers to *Polystictus scopulosus* Yasuda sp. nov.; *Coniophora arida* (Fr.) Cooke; and *Hypocrea citrina* (Pers.) Fr.—*L. L. Burlingame.*

1199. Zeller, S. M., and C. W. Dodge. **Arcangeliella, Gymnomyces, and Macowanites in North America.** Ann. Missouri Bot. Gard. 6: 49–59. *Fig. 1–3.* 1919.—Descriptions of the species occurring in North America are given, together with original descriptions of extralimital species. *Arcangeliella caudata*, *Gymnomyces Gardneri* and *Macowanites echinosporus* are described as new. *Hydnangium Soderstromii* Lagerheim is newly combined as *Arcangeliella Soderstromii* (Lagerh.).—*S. M. Zeller.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

1200. Anonymous. [Rev. of: Seward, A. C. **Fossil plants, vol. IV., Ginkgoales, Coniferales and Gnetales.** Cambridge University Press: Cambridge, England, 1919. *xvi + 544 p. 190 illus.*] Jour. Botany 57: 323–324. 1919.

1201. Anonymous. **Plant fossils and the past.** Sci. Amer. 120: 360. 1919.

1202. Berry, E. W. **The history of the linden and ash.** Plant World 21: 163–175. *3 fig.* July, 1918. 1919.—An account of the present distribution and the geological history of the genera Tilia and Fraxinus.—*E. W. Berry.*

1203. Chamberlain, C. J. **Bennettitales.** [Rev. of: Stopes, Marie C. **New Bennettitean cones from the British Cretaceous.** Phil. Trans. Roy. Soc. London B208: 389–440, *6 pl. 25 fig.* 1918.] Bot. Gaz. 67: 375–376. 1919.—See also Bot. Absts. 1, Entry 594.

1204. Dollfus, G. F., and P. Marty. **Découverte d'un gisement fossilifère dans le Cantal.** [Discovery of a fossiliferous deposit in the Cantal.] Compt. Rend. Acad. Sci. Paris 167: 534. Oct., 1918.—Records freshwater shells, mammalian and fish bones and seeds of Umbelliferae, Rosaceae, Compositae, and Scrophulariaceae from a lignitic clay in an andesitic agglomerate at Pont de Gail in the Goul valley, Cantal, France, of lower Pliocene (Plaisancian Age).—*E. W. Berry.*

1205. Florin, R. **Eine übersicht der fossilen Salvinia-arten mit besonderer berücksichtigung eines fundes von Salvinia formosa Heer in Tertiär Japans. [A review of the fossil species of Salvinia with special reference to a discovery of Salvinia formosa Heer in the tertiary of Japan.]** Bull. Geol. Inst. Upsala 16: 213–260. *11 pl.* 1919.—Records *Salvinia formosa* Heer from the late Tertiary of Japan and passes in critical review the various fossil species in the literature of paleobotany.—Ten are recognized from strata ranging in age from Eocene to Pliocene and covering North America, Europe and Asia. *S. elliptica* Newberry is given as from the Upper Cretaceous of Washington State. It really comes from the Eocene Puget group.—*E. W. Berry.*

1206. Gothan, W. **Das Alter der Karbonformation nördlich der Roer und Allgemeines über Horizontierung im Karbon mit Hilfe der Flora. [The age of the coal deposits north of the Roer, and generalizations concerning stratification in coal by means of the flora.]** Glückauf 55 Jahrg. No. 26. 477–483. June 28, 1919.

1207. Gothan, W. **Über einen interessanten Pteridospermenfund. [Discovery of an interesting Pteridosperm.]** Zeitg. Deutsch. Geol. Gesell. 71: 14. 1919.—Records a specimen of *Sphenopteris dicksonoides* Göppert from the Carboniferous of Lower Silesia with seeds and cupules of Lyginopteris type, and a specimen of *Sphenopteris adiantoides* Schlotheim (*elegans* of authors) with Telangium or Calymmotheca cupules or microsporangia.—*E. W. Berry.*

1208. Gothan, W. **On the Taeniopteris multinervia of Meister.** Zeits. Deutsch. Geol. Gesell. 71: 12–13. 1919.—Suggests that this form which the author thought was a Glossopteris is really an Acrostichum and the deposits in which it was found are Tertiary in age instead of Paleozoic.—*E. W. Berry.*

1209. Gothan, W., and E. Zimmerman. **Pflanzliche und tierische fossilien der deutschen Braunkohlenlager. [Plant and animal fossils of the German brown coal deposits.]** *54 p., 41 fig.* Halle (Saale). 1919.—A well illustrated popular account of the fossils found in and associated with the brown coal deposits of Germany. Thirty pages and 24 figures are devoted to the more interesting fossil plants that have contributed to the formation of the coal. The remainder of the booklet is devoted to the shells, insects and vertebrates of the deposits.—*E. W. Berry.*

1210. Harder, E. C. **Iron-depositing bacteria and their geologic relations.** U. S. Geol. Surv. Prof. Paper 113. *89 p. 14 fig., 12 pl.* 1919.—Presents the carefully digested results of field and laboratory studies of springs, bogs, mine and stream waters by a geologist who has had exceptional opportunities of studying the iron ore deposits of different parts of the world and who has been especially interested in their mode of origin, especially the enormous amounts of sedimentary ores, bog ores and surface concentrations, the origin of which has usually been attributed to the inadequate processes of simple exidation and precipitation from ferrous solutions; since about 90 per cent of the present iron production comes from these sources the question of origin is one of great economic importance. It is of great interest to the student of earth history and also to the students of plant evolution and history, since these types of ores are common at all geological horizons and are especially prominent in the pre-Cambrian as in the Lake Superior region, in Minas Geraes, Brazil, and in India. Biologists are much interested in the bearing upon evolutionary problems of the possible occurrence in early geologic times of bacteria and similar organisms. Mr. Harder concludes that there are three principal groups of iron-depositing bacteria—(1) those that precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide for metabolic energy; (2) those that do not require ferrous bicarbonate for their vital processes but cause the deposition of ferric hydroxide when either inorganic or organic salts are present; and (3) those that attack iron salts of organic acids using the acid radicle and leaving the ferric hydroxide or basic ferric salts. Not only are the higher so-called thread bacteria found to be widely distributed in nature but the author shows that many of the more primitive bacteria are concerned in the rôle of iron precipitation.—The paper, in addition to the new facts recorded, constitutes a critical summary of previous work and a full bibliography. [See Bot. Absts. 4, Entry 1106.]—*E. W. Berry.*

1211. Knowlton, F. H. **A catalogue of the mesozoic and cenozoic plants of North America.** Bull. U. S. Geol. Surv. 696. *815 p* (1919.) 1920.—Contains a bibliography, an alphabetical list of species under their appropriate genera, also alphabetically arranged, with citations of generic types, citations and occurrences for species, list of genera arranged botanically and lists of floras of different geological formations arranged chronologically. An invaluable reference work brought up to 1919.—*E. W. Berry.*

1212. Kryshtofovich, A. **On the flower of Williamsonia sp., found near Vladivostok, and some other fossil plants from the maritime province of Asiatic Russia.** Jour. Geol. Soc. Tokyo 26: 1–5. *2 fig.* Nov., 1919.—Records the following Jurassic plants from Vtoraya Riechka, 9 km. north of Vladivostok: *Onychiopsis elongata* Yok., *Cladophlebis denticulata* Font., *Laccopteris Dunkeri* Schenk, *Sagenopteris* of *Mantellii* Schenk, *Nilssonia orientalis* Heer, *Dioonites* cf *Ketoi* Yok., *Williamsonia* sp., *Podozamites lanceolatus* L. & H., *Elatocladus subzamioides* Möller and *Brachyphhllum* sp.—A second Jurassic locality at Brashnikova Bay near Okeanskaya, about 20 km. north of Vladivostok furnished *Onychiopsis elongata* Yok., *Klukia exilis* Racib. and *Equisetites* cf. *Yokoyami* Sew.—A third locality on the Japan Sea south of Cape Bielkin is of Tertiary age and has furnished a five petalled flower, an Acer samara and leaves of Fagus, Juglans, Alnus and Grewia.—*E. W. Berry.*

1213. Laurent, L. **Addition à la flore fossile des schistes de Ménat (Puy-de-Dome). [Addition to the fossil flora of the Ménat shale (Puy-de-Dome).]** Ann. Mus. Hist. Nat. Marseille 17: 3–8. *1 pl.* 1919.—Describes *Calamopsis pomeli* sp. nov. from the Oligocene bituminous shales of Mènat in central France.—*E. W. Berry.*

1214. Laurent, L. **Les Liquidambars. Essaî de filiation des formes actuelles et fossiles du genre Liquidambar. Synthâe du genre. [The liquidambars. Relationships of recent and fossil forms of the genus Liquidambar. A synthetic treatment of the genus.]** Ann. Mus. Hist. Nat. Marseille. 17: 9–27. *Pl. 2, 3.* 1919.—Discusses the characters and the peculiar distribution of the recent species, critically reviews the various fossil species which have been described and concludes that the genus originated in the Arctic region from which it spread southward in all directions, that *L. europaeum* Heer is the single specific type throughout the Tertiary, the described forms being merely varieties of this form which gave origin to the single existing specific type, namely *L. styraciflua* L. of which *L. orientalis* Mill. and *L. formosana* Hance and other Asiatic mutants are merely geographic varieties or post glacial isolated remnants of a previously Holarctic distribution.—*E. W. Berry.*

1215. Marty, P. **Un fruit fossile de Lezoux (Puy-de-Dome). [A fruit fossil from Puy-de-Dome.]** Rev. d'Auvergne ann 1919: 1–17. *4 fig.*—Records well preserved fruits from the middle Stampian of Lezoux which are considered identical with *Cucumites variabilis* described by Bowerbank from the much earlier Ypresian of the London Basin. Extended comparisons are made with various species that have been referred to the genus Apeibopsis Heer.—*E. W. Berry.*

1216. Moodie, R. L. **Thread moulds and bacteria in the Devonian.** Science, n.s. 51: 14–15. Jan. 2, 1920.—An examination of the enlarged and distorted lacunae in the bony carapaces of the fish-like forms Bothriolepis and Cocosteus from the Devonian show the unmistakable activity and probable presence of thread moulds (Mycelites) and bacteria (Micrococcus). Apriori reasons were convicing for regarding these lowly organisms as present in great abundance in the older rocks but none have been recorded in the long interval between the pre-Cambrian occurrences described by Walcott and the Carboniferous forms described by Renault, so that the present contribution helps to bridge this gap in the record.—*E. W. Berry.*

1217. Nathorst, A. G. [Rev. of: Antevs, E. **Die liassische flora des Horsandsteins. (Liassic flora of Hör sandstone.)** K. Sv. Vet. Akad. Handl. 59.[3] 1919.] Geol. Fören. Förhandl. 4: 524–527. 1919.

1218. Petronievics, B. **La loi de l'evolution non corrélative.** [**The law of non-correlative evolution.**] Rev. Gen. Sci. Pures et Appliquées 30: 240-242. 1919—Discussion of the so-called law, based on zoological and paleontological material.—*G. J. Peirce.*

1219. Walcott, C. D. **Middle cambrian algae.** Smith. Misc. Coll. 67: 217-260. *Pl. 43-59.* 1919.—A continuation of the author's extensive paleontological studies of the Burgess shale of British Columbia of Middle Cambrian age. All of the forms are preserved as thin films in the shale and consequently their essential features are largely obscured. All are considered to have been planktonic forms and all are described as new species. They confirm the view that the algae as a whole have undergone but slight change during the millions of years of their history. Following are the forms described with their taxonomic position:

Cyanophyceae
    Order Hormogoneae
        Family Nostocaceae
            Morania confluens
            Morania costellifera
            Morania elongata
            Morania fragmenta
            Morania frondosa
            Morania (?) globosa
            Morania parasitica
            Morania (?) reticulata
            Marpolia spissa
            Marpolia aequalis
Chlorophyceae
            Yuknessia simpcx
Rhodophyceae
            Waputikia ramosa
            Dalyia nitens
            Dalyia racemata
            Wahpia insolens
            Wahpia mimica
            Wahpia virgata
            Bosworthia radians
            Bosworthia gyges
Calcareous Algae
            Sphaerocodium (?) praecursor
            Sphaerocodium (?) cambria

—*E. W. Berry.*

1220. Worsdell, W. C. **The origin and meaning of medullary (intraxylary) phloem in the stems of dicotyledons. II. Compositae.** Ann. Botany 33: 421-458. 1919.—See Bot. Absts. 4, Entry 1006.

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

1221. Amos, Arthur. **The difficulties of growing red clover. Clover sickness and other causes of failure.** Jour. Roy. Agric. Soc. England 79: 68-88. *5 fig.* 1918.—See Bot. Absts. 4, Entry 1.

1222. Anonymous. **Wart disease of potatoes order, 1918, and inspection of immune crops.** Jour. Bd. Agric. Great Britain Suppl. 18: 114-115. 1919.—The planting of varieties of potatoes susceptible to the wart disease (*Synchytrium endobioticum*) in districts that have been certified as "infected areas" is prohibited by an order of the Board of Agriculture in 1918. To provide seed of immune varieties reasonably free from "rogues" for use in these infected areas, arrangements were made by the Board for the growth under careful field inspection and rogueing of nine immune varieties of potatoes in Scotland. Under this arrangement over 4000 acres of potatoes were inspected of which 3650 passed the standard prescribed for the issue of a certificate. Where the crop was satisfactory a certificate was issued to the effect that the potatoes were of the variety specified, true to type and reasonably free from "rogues." The vendor of this inspected seed is obliged to quote the number of the certificate on the invoice on all sales. The lack of an adequate supply of First Early varieties immune from wart disease presents a serious difficulty now but it is anticipated that this difficulty will be entirely overcome by 1921.—*M. B. McKay.*

1223. Anonymous. **Root-knot trouble in fruit trees.** Jour. Dept. Agric. South Australia 22: 535–536. 1919.—A root-knot trouble affecting the peach, almond, prune and pear trees. The trees become stunted and ultimately die, especially if attacked the first few years after planting. The disease is most severe on sandy soil. The galls appear to be annual in character, vary greatly in size and are about the texture and color of a toughened turnip root. The disease is now under investigation by the departmental pathologist.—*Anthony Berg.*

1224. Anonymous. **Yellow-leaf disease in Phormium tenax.** New Zealand Jour. Agric. 19: 89–93. 1919.—This article deals with a report made by L. Cockayne. The affected plants have very distinctly yellowed leaves due to the fact that many of the roots are decayed. After 14 months study he concluded that the disease was due to a fungus or to bacteria. R. Waters of the Biologist's office has isolated a fungus, but its parasitism has not been proved. A study of selected plants in various locations has shown that the disease is favored by stagnant water about the roots, that diseased plants may recover, and that there is very strong probability that the selection of resistant plants from badly infested areas may be the best method of procedure.—*N. J. Giddings.*

1225. Anonymous. **Fungi from Singapore and Penang. "Fungi Singaporensis Bakeriani."** Gardens' Bull. Straits Settlements 2: 116–120. 1919.—See Bot. Absts. 4, Entry 1050.

1226. Anonymous. **Hints on storing timber to prevent decay.** Sci. Amer. 120: 339–360. 1919.

1227. Anonymous. **Echinodia theobromae Pat.** [English translation from French.] Gardens' Bull. Straits Settlements 2: 144–145. 1919.—See Bot. Absts. 4, Entry 1051.

1228. Anonymous. **Starkes Auftreten des grünen Eichenwicklers (Tortrix viridana L.) in der Wiener gegend. [Attacks of green oak roller (Tortrix viridana L.) in the Vienna region.]** Oesterreich. Forst- u. Jagdzeitg. 1924: 303. November 21, 1919.—Notice of heavy attacks of *Tortrix viridana* on oak stands in the sandstone region of the Vienna forest. The increased intensity is laid to caterpillars which injured the leaves, followed by a mildew that destroyed the leaves that appeared in summer following caterpillar attack. This led to a congestion of sap in the roots owing to the reduction of leaf (transpiring) surface, which encouraged attacks of *Agaricus melleus*. The trees thus weakened formed favorable hosts to the Tortrix.—*F. S. Baker.*

1229. Anonymous. **Paste which preserves watermelons.** Sci. Amer. 121^{12}: 299. 1919.—The paste described furnishes complete protection to the stem end of the watermelon, a point of possible decay during transit. It is made by dissolving 4 ounces bluestone in 2 pints boiling water and thoroughly mixing with a paste consisting of 3 ounces powdered alum and $4\frac{1}{2}$ ounces rye flour in 1 pint of water. The mixture is cooked for 5 minutes, cooled and strained through cheese-cloth, and is dyed green with pistachio green before using.—*Chas. H. Otis.*

1230. Anonymous [Dodge, B. O.]. **Index to American mycological literature.** Mycologia 11: 323–326. 1919.

1231. Anonymous [Dodge, B. O.]. **Index to American mycological literature.** Mycologia 12: 55–58. 1920.

1232. Arnold, Geo. **Stem rot of the aster.** Florists' Exchange 48: 349. 1919.—On Aug. 2, aster fields near Rochester, N. Y., showed discouraging prospects for seed and for cut flowers. With one exception all the fields were more or less damaged by stem rot [*Fusarium* sp.]. This was particularly true of the early varieties; and the plants of all varieties were stunted by the work of the tarnished plant bug. Though it is believed that the infection of the stem rot is carried over in the soil, one field on which asters had not been grown before was seen to be hard hit by the rot. A probable contributing cause was a heavy coating of

stock yard manure applied the spring before. Probably in most of the cases seen the plants might have escaped serious injury from stem rot if they had not had their growth checked by unfavorable conditions of soil, and the ravages of the tarnished plant bug. There is a decided difference in the susceptibility of the various types of asters to stem rot. It might be possible to select strains from the more resistant sorts that would be practically immune.—*L. A. Minns.*

1233. Atanasoff, D., and A. G. Johnson. **Treatment of cereal seeds by dry heat.** Jour. Agric. Res. 18: 379–390. *Pl. 48–49.* 1920.—Preliminary data indicate that seed of the cereals —barley, wheat, rye and oats—when of good quality and well dried will withstand protracted exposure to dry heat at comparatively high temperature (30 hours at 100°). *Bacterium translucens*, causing blight of barley, and *Pseudomonas avenae*, causing blight of oats, are killed by baking at a temperature which is not injurious to the seed. The following seed-borne fungous diseases are practically eliminated, so far as primary infection is concerned, by the treatments: wheat scab (*Gibberella saubinetii* and *Fusarium* spp.) and spot blotch of barley (*Helminthosporium sativum*). Net blotch (*H. teres*) and stripe disease (*H. gramineum*) of barley, blotch of oats (*H. avenae-sativae*), loose smut of barley and the smuts of oats are reduced very materially by the treatment.—*D. Reddick.*

1234. Bahr, Fritz. **A sure cure for damping off.** Florists' Exchange 47: 356. 1919.—Mix the soil for seed sowing, soak thoroughly with formaldehyde at the rate of one fluid ounce to a quart of water, and let dry out before using; also soak pans, pots and drainage crock in the same solution.—*L. A. Minns.*

1235. Baker, C. F. **Hevea versus fungi.** Gardens' Bull. Straits Settlements 2: 109–113. 1919.—Twenty-eight fungi are listed which are found associated with *Hevea brasiliensis*, *Hevea* or Para rubber; ten of the fungi were found to be new species and one a new genus, the determinations of the author's collections being made by Saccardo. Emphasis is placed upon the importance of adequate investigation of fungous diseases of this tree.—*S. F. Trelease.*

1236. Baker, C. F. **Mango pests in Singapore.** Gardens' Bull. Straits Settlements 2: 115–116. 1919.—Mangoes are severely attacked by three pests: a psyllid, and two fungi—*Meliola mangiferae* and *Zimmermanniella trispora.*—*S. F. Trelease.*

1237. Ball, E. D. **The potato leafhopper and the hopperburn.** Phytopath. 9: 291–293. 1919.—The burning and upward curling of the tips and margins of foliage of potato and other hosts is attributed to the work of leafhopper (*Empoasca mali*). Eggs are deposited in the midrib of the leaf from which nymphs emerge in a week or two. The injury to the veins causes death of the margins. Plants caged with the insects showed burn after three days while infected plants caged free from insects recovered. The injury was widespread in 1918 and in all cases examined leafhoppers were associated with the injury which appeared in certain rows and varieties rather than according to sun exposure or soil conditions. Black-Leaf-40, 1:800 with the addition of 5 parts of soap proved an effective spray.—*Maude Miller.*

1238. Batchelor, L. D., and H. S. Reed. **Winter injury or die-back of the walnut.**—California Agric. Exp. Sta. Circ. 216. *20 p.* 1919.—See Bot. Absts. 4, Entry 898.

1239. Baumann, E. **Zur Frage der Individual- und der Immunitäts-Züchtung bei der Kartoffel. [Individual selection and immunity breeding in potatoes.]** Fühl. Landw. Zeitg. 67: 246–253. 1918.—The first step in improving potato culture consists in selecting from among the very numerous varieties certain ones which are high yielders and which possess high resistance. This is most satisfactorily accomplished by separating varieties into vegetative lines which permit testing of the hereditary characters of both normal and pathological nature; this leads to a better knowledge of certain varieties and provides data which are of direct value in special breeding work. Experimental data covering a number of years are presented in support of the conclusion.—*Ernst Artschwager.*

1240. Bernard, Ch. **Aanvullende mededeelingen over de wortelziekten van de thee. [Supplementary contribution to the root diseases of tea.]** Mededeel. Proefstat. voor Thee [Buitenzorg] Dept. Landb., Nijverheid en Handel 61a: 1–7. *Pl. 1–10* (*2 colored*). 1919.—This paper which is a supplement to No. 61 gives the illustrations and additional notes. Numerous cases of partial or entire recovery were found from root-collar attacks by *Ustulina zonata*. Generally, however, a plant attacked by any of the root parasites is lost and effort must be directed to protect the neighboring bushes. Frequent combination of the different fungi on the same plant is recorded. Thus on high lying estates *Armillaria mellea* is associated with *Rosellinia bothrina*, while on the lower lying estates *Ustulina zonata* is found with the *Rosellinia*. In Sumatra the Rosellinia with *Poria hypolateritia* or *Rosellinia* with *Fomes* commonly occur. Detailed notes on the symptoms of the various diseases are given in explanation of the plates.—*R. D. Rands.*

1241. Biffen, R. H. **Annual report for 1918 of the botanist.** Jour. Agric. Roy. Soc. England 79: 254–258. 1918.

1242. Bobilioff, W. **Over de oorzaak der bruine binnenbastziekte van Hevea Brasiliensis. [The cause of brown bast disease of Hevea Brasiliensis.]** Arch. Rubbercult. Nederlandsch-Indië 3: 172–178. 1919.—The brown bast disease is not caused by a parasite but seems to be of definite non-parasitic nature. The severity of the disease depends upon the general physiological conditions of the tree. The slightest trace of this disease in the bark may be shown by the phloroglucin reaction. As the disease develops anatomical changes can be noted in the bark: the formation of a brown degeneration substance in the intercellular spaces and middle lamellae of the cortex cells giving the principal reactions of lignin; the abnormal formation of stone cells; and the formation of burs.—*W. E. Cake.*

1243. Bokura, U. **A bacterial disease of lily.** Ann. Phytopath. Soc. Japan 1^2: 36–90. *Pl. 1–2.* 1919.—The disease is the cause of great loss in many lily-growing regions in Japan. When the organisms attack the subterranean parts of the plant, growth of the young plant is greatly retarded, and the first apparent symptoms appear on the stem as pale brown stripes, which enlarge in area and finally result in damping off. If infection takes place upon the leaves or the stems, especially on the cut surface of the latter, brownish discoloration appears on the affected parts, the leaves falling off prematurely one after another. Plants attacked in that manner may not survive. *Lilium tigrinum*, *L. auratum*, and *L. venustum* are listed as most susceptible, and *L. speciosum* is considered to be most resistant. Outbreak of the disease is greatly predisposed by excess of nitrogenous manure and of moisture. The organism as an actively motile rod with 6 to 8 peritrichiate flagella, $0.8–1.0 \times 0.6–0.7 \mu$. Cultural characteristics and proofs of pathogenicity are described at length. Reduction of nitrate, production of ammonia, hydrogen sulphide and indol, presence of cytase, oxidase and trypsin are qualitatively demonstrated. Optimum growth occurs at 32° to 34°C.; exposure for 3 minutes at 50°C. kills the organisms, while freezings are not so harmful. The parasite is not very sensitive to direct sunlight and disinfectants. The control measures are outlined, the most promising methods consist in the rotation of crops, in the avoidance of infected bulbs, in soil disinfection with formalin, and in spraying with Bordeaux mixture. Excess of nitrogenous manure should be avoided, balanced fertilizers being recommended. The name *Bacillus Lilii* Uyda is proposed for this organism.—*T. Matsumoto.*

1244. Bottomley, Averil Maud. **A preliminary investigation into a disease attacking young Cupressus plants.** South African Jour. Sci. 15: 613–617. *Pl.18–21.* 1919.—As a result of inoculation and cultural experiments in 1915, a *Phoma* was established as the cause of a serious disease in young plants of *Cupressus* sp. This has recently been identified with a *Phoma* on red cedars described by Hahn, Hartley and Pierce. The disease is characterized by discoloration of the twigs, followed by withering and death, the pycnidia of the fungus being visible on the dead leaves and twigs as small black dots. The cultural and morphological characters of the fungus are described in detail. Injured *Cupressus* plants readily

became infected with the *Phoma* sp. within a few days, but uninjured plants only after some weeks. Spraying with Bordeaux mixture is recommended as a control measure.—*E. M. Doidge.*

1245. Boulger, G. S. [Rev. of: Rankin, W. H. Manual of tree diseases. Macmillan Co.: New York, 1919. *xx+398 p., 70 fig.*] Jour. Botany 57: 165-167. 1919.

1246. Brandes, E. W. Banana wilt. Phytopath. 9: 339-390. *13 pl., 5 fig.* 1919.—In any given region the wilt affects most severely the variety of banana most widely planted there. The range of this disease coincides in general with that of the cultivated banana. Sudden, vivid yellowing of the outer or lower leaf blades and petioles, decided dwarfing of the entire plant, and longitudinal splitting of the outer leaf bases are all symptoms of the disease, brought on by varying conditions. The disease changes the color of the stelar tissue of the rhizome. A careful description of sporodochia, conidia, mycelium and cultural characteristics of *Fusarium cubense* is given, and methods of isolation are described. Temperature, moisture, light, and oxygen supply relations were determined experimentally. Banana wilt is probably the results of toxic excretions by the fungus, *Fusarium cubense*, which has been shown to be the cause of the disease. Inoculum consists of macroconidia and microconidia. Dissemination is mostly carried on by air currents, water, mud, and infected leaves used for protecting bunches packed in cars for shipment. Infection courts are two in number, the wound on the rhizome where the sucker is cut off, and the side of the bulb where a root is given off. Penetration is by means of a germ tube. Growth is intracellular. The severity as well as the spread of banana wilt is strikingly correlated with certain well defined weather conditions. Arid regions where irrigation is necessary are entirely free from banana wilt. Exclusion, eradication, and immunization are suggested as control measures.—*R. G. Bitterman.*

1247. Brandes, E. W. The mosaic disease of sugar cane and other grasses. U. S. Dept. Agric. Bull. 829. *26 p., 1 pl.* (*colored*), *fig. 1-5.* 1919.—The mosaic disease of sugar cane is similar to that commonly found on the tomato, potato, bean, tobacco and cucumber and is defined as an "infectious chlorosis." Although common in cane fields of Argentine, Java, Cuba, and the Hawaiian Islands for some time, mosaic appeared in Porto Rico about 1916 and has since spread to three-fourths of the fields of this Island. Losses incurred have range s as high as nearly 50 per cent decrease in tonnage. Survey of the cane areas of the Gulf States of the United States show several limited areas of infection in Louisiana, Mississippi, Georgia and Florida.—Characteristic symptoms of mottling and striping are described as present in the leaves. In more advanced stages there is a tendency toward dwarfing and yellowing of the plant though the plant is seldom actually killed. Injuries similar to mosaic but induced by environmental, fungous and bacterial agencies are also described.—More than a thousand varieties including all the leading commercial ones in the United States are susceptible. Nearly all varieties of Cuba and Hawaiian Islands are susceptible. Many Japanese varieties, notably Kavangire and Cayuna 10 are entirely immune. Corn, sorghum, rice, millet, crabgrass, foxtail and *Panicum* have proved to be hosts to mosaic of the same identity. The wild grasses commonly associated with cane seem to be immune. The disease is due to some virus or inoculum and not to such previously suggested causes as worn out soils, climatic conditions, "run-out" varieties and bud variations. Infectiousness of mosaic is probably due to insect carriers and the incubation period ranges from two to three weeks. Infection is not thought to be by simple contact of plants.—Commonly transmitted through the planting of diseased seed pieces and no indication that contagion persists in the soil. Seed disinfection with Bordeaux mixture or corrosive sublimate has not been effective. Fertilizers and liming also not effective. 'Control measures which have proved efficient and which are now advocated are: selection of healthy seed plants, use of clean seed and resistant varieties, inspection of and rogueing of diseased plants from slightly infected fields, exclusion of infected seed stock from healthy cane areas and the eradication of the disease in areas of recent infection.—*E. V. Hardenburg.*

1248. Brioli, J. **Zur Feststellung der Ustilago nuda im embryo der Gerste. [Determination of U. n. in the embryo of barley.]** Fühl. Landw. Zeitg. 67: 336–337. 1918.—Mycelium of *U. nuda* is easily detected in the scutellum where it is abundant. The difficult part is to get thin sections. To do this remove seed coat with scalpel and cut off a tangential section 5 mm. deep. Then make thin sections with razor. Mount sections in concentrated solution of chloral hydrate.—It is thus possible to secure infected but viable seed for experimental purposes.—Affected barley tissue transferred to slices of potato yields a fungus which apparently is *U. nuda*, but it has not been transferred back to barley.—For infection work pot grown barley which is nearly ready to bloom is placed in cool shady place for a few days. When it is brought into the sun many blossoms open within an hour.—*D. Reddick.*

1249. Brittain, W. H. **Spraying and dusting experiments, 1918.** Fruit Growers' Assoc. Nova Scotia Ann. Rept. 55: 102–110. 1919.—The work of four years on apple trees (*Pyrus Malus*) is summarized. Spraying with lime sulphur (1.009 sp. gr.) four times may cause 66 to 75 per cent of the fruit to drop and injure 41 per cent of the foliage of certain varieties such as King, Baldwin, Ben Davis, while on others, like Russet, no injury is apparent. The injury is non-existent in some seasons. Most damage is done by the fourth spray (after the fruit is set). In a comparison of sulphur dust with liquid spray the percentage of apples free from scab (*Venturia inaequalis*) is 96 and 99 per cent respectively, and of apples free from all blemishes, 56 and 73 per cent respectively, the difference in the latter case being due to attacks of sucking insects. The following sprays are recommended: (1) Bordeaux mixture (7:7:100); (2) Soluble sulphur; (3) Same as (1).—*Paul A. Murphy.*

1250. Brittlebank, C. C. **II.—Tomato diseases** Jour. Dept. Agric. Victoria 17: 498–500. 1919.—Leaf spot of tomatoes, *Septoria lycopersici* is described. The signs of the disease, its method of spreading and control measures are discussed.—*J. J. Skinner.*

1251. Brittlebank, C. C. **Diseases of plants new to Victoria.** Jour. Dept. Agric. Victoria 17: 626–629. *Pl. 1–2.* 1919.—The anthracnose of lettuce caused by *Marssonina panatonniana* and Botrytis and Sclerotinia diseases of the passion vine are described and control measures given. These were first noted in Victoria in 1916.—*J. J. Skinner.*

1252. Brock, W. S. **Five years' experimental work in dusting apples.** Trans. Indiana Hortic. Soc. 1918: 150–156. *1 fig.* 1919.—Development of dusting is traced. Scab and blotch are not controlled. Dusting is more expensive than spraying because of cost of materials. Dusting is advisable for very large orchards, for orchards where diseases are not serious, as a supplementary protection, and for the peach grower. Discussion centers about amount of dust applied per tree and spray gun vs. dust.—*Max W. Gardner.*

1253. Brock, W. S. **Apple blotch control.** Trans. Indiana Hortic. Soc. 1918: 103–111. 1919.—The geographical distribution and economic importance of the disease in Indiana and Illinois and the life history of the causal fungus are reviewed. Spores are exuded between 3 and 4 weeks after the petals fall. Spraying should begin 3 weeks after the petals fall. Lime-sulphur solution or Bordeaux 3:4:50 should be used. In the discussion the questions of dormant spray for blotch, exact time of spray application, effect of fertilizer, effect of pruning, Bordeaux vs. lime-sulphur are considered.—*Max W. Gardner.*

1254. Brooks, Charles, J. S. Cooley, and D. F. Fisher. **Nature and control of apple scald.** Jour. Agric. Res. 18: 211–240. 1919.—See Bot. Absts. 4, Entry 1617.

1255. Brooks, F. T. **Report on the potato spraying trials, 1918.** Jour. Bd. Agric. Great Britain Suppl. 18: 63–68. 1919.—Coöperative trials were carried on in many localities under a wide variety of conditions to obtain more explicit information on the value of spraying with Bordeaux mixture in different parts of the country, as a means of controlling potato blight (*Phytophthora infestans*). Generally the average gain of sound tubers in favor of plots sprayed more than once was about 1.5 tons per acre. Three sprayings gave the best results and two sprayings were superior to one in most cases. No appreciable increase of sound tubers was

obtained in general by spraying with a two per cent mixture instead of a one per cent mixture. In smoky districts the use of larger amounts, 6 and 7 pounds to 40 gallons instead of the usual 5 pounds, of soda tended to reduce the danger of scorching. Dusting did not give as good results as spraying but where water or labor is short it may be used in place of spraying and should be used in preference to no treatment if blight is likely to be severe. No considerable gain in adhesiveness was secured through the use of soft soap, soap powder, or glue.—*M. B. McKay.*

1256. Brooks, F. T. **An account of some field observations on the development of potato blight.** New Phytol. 18: 187–200. *2 fig.* 1919.—Field observations on the first development of *Phytophthora infestans* were undertaken to determine the method of overwintering. While the problem was not solved, the first attacks were found to be strictly limited in extent where infection was not extraneous. Infection spreads centrifugally from the point of appearance. —*I. F. Lewis.*

1257. Bruner, Stephen C. **Notas sobre la enfermedad del mosaico de la cana de azucar. [Notes on sugar cane mosaic.]** Revist. Agric. Com. y Trab. 2: 532–533. *1 fig.* 1919.—Several observations showing the infectious nature of the sugar cane mosaic are recorded. Healthy plantings became infected from nearly diseased plantings.—*F. M. Blodgett.*

1258. Bruner, Stephen C. **Informe sobre enfermedades del cafeto. [Report on coffee tree diseases.]** Revist. Agric. Com. y Trab. 2: 533–535. *2 fig.* 1919.—The occurrence of two coffee tree diseases are recorded for the first time for Cuba, namely the thread blight caused by the fungus *Pellicularia koleroga* and the iron spot (mancha de hierro) caused by the fungus *Stibella flavida.* These are described and spraying with Bordeaux mixture is recommended as a control. The leaf spot caused by *Cercospora coffeicola* is described and is said to be worse with insufficient shading.—*F. M. Blodgett.*

1259. Burkholder, Walter H. **The dry root-rot of the bean.** Cornell Univ. Agric. Exp. Sta. Mem. 26: 999–1033. *Pl. 56–57; fig. 133–135.* 1919.—In addition to the varieties of *Phaseolus vulgaris* the disease occurs on *P. acutifolius latifolius*, *P. mutliflorus*, *P. aconitifolius*, *P. lunatus*, *P. angularis*, *Vigna sinensis* and *Dolichos biflorus.* *Pisum sativum*, *Trifolium* spp., *Vicia* sp., *Soja max*, *Zea mays*, *Solanum tuberosum*, *Avena sativa*, *Triticum* sp., *Ambrosia*, *Prunella*, *Chenopodium* and *Rumex*, all of which are grown in rotation with beans or occur as weeds are not affected.—The disease occurs in 90 per cent of the fields of western New York. In a wet season losses in experimental plats were about 5 per cent but in a dry season they were 50 per cent.—The roots are affected and slowly dry out; tap roots show reddish discoloration and lesions extend into the stem but rarely appear above ground; foliage turns yellow; pods wither or do not fill. *Fusarium martii phaseoli* n. f. causes the disease. It differs from type only in its parasitism on bean. The fungus winters as mycelium or chlamydospores in the compost heap or field. Observation indicates that the organism may persist many years without the living host.—The effect of external conditions on host and parasite are discussed in some detail.—The following chemicals were used on the soil as disinfectants but none gave any indication of value: lime, acid phosphate, sulfur, formaldehyde, calcium hypochlorite, calcium cyanamid.—Individuals of a late, aberrant type of bean called Flat Marrow have been found which are very resistant to the disease. Hybrids with commercial varieties have shown a very complex segregation. No desirable White Marrow strain has been isolated as yet.—Black root-rot, caused by *Thielavia basicola*, and blotch, caused by *Rhizoctonia* sp., are described very briefly.—*D. Reddick.*

1260. Burkill, I. H. **Lightning and Hevea.** Gardens' Bull. Straits Settlements 2 : 145. 1919.

1261. Burleigh, W. B. **Formaldehyde for damping off.** Florists' Exchange 47: 445. 1919. —The writer has used formaldehyde for 4 years with unvarying success. He does not allow soil to dry out after treatment before sowing seed; uses soil while moist but not wet as it gives the seed also a moderate treatment.—*L. A. Minns.*

1262. Butler, O. R. Field control of the snapdragon rust.—Florists' Exchange 48: 951. 1919.—Many practical tests lead to the conclusion that finely powdered sulfur or sublimed sulfur is the only known fungicide that affords adequate protection against the snapdragon rust so long as conditions are favorable for its action. The temperature most favorable for the germination of spores of *Puccinia antirrhini* is 50°F. In order that sulfur shall afford full protection, the day temperature must remain for several hours at 70°F. or above. It is only at this higher temperature and in the immediate neighborhood of the sulfur particles that protection is afforded. If all infected plants in a block are not treated, the spores produced on a non-sulfured plant are not affected by the presence of sulfur on neighboring plants, and if blown onto sulfured snapdragons under conditions favorable for germination and at a prevailing temperature too low for the sulfur to be active, will cause infection and the sulfuring will appear less beneficial than it really is.—*L. A. Minns.*

1263. Byars, L. P. Experiments on the control of the root-knot nematode, Heterodera radicicola (Greef) Mueller. I. The use of hydrocyanic-acid gas in loam soil in the field. Phytopath. 9: 93-103. 1919.—Results secured in 1916 and 1917 as a result of treatimg loam soil in Florida in 1916 with hydrocyanic acid for the control of nematodes are presented in tabular form. Carefully isolated small plots were treated at the rate of 600 to 3600 pounds of sodium cyanide per acre in conjunction with 900 to 5400 pounds of ammonium sulphate. The dasheen (*Colocasia esculenta*) was used as a test crop. The higher applications checked the infections and lower amounts reduced the infection the first year. The nematodes were not entirely destroyed at the highest application as shown by infection the following year. The cost of application is considered too high to render the use of this method practical except on a small scale.—*J. Johnson.*

1264. Byars, L. P., A. G. Johnson, and R. W. Leukel. The wheat nematode, Tylenchus tritici, attacking rye, oats, spelt and emmer. Phytopath. 9: 283-284. 1919.—Experiments were conducted to show the host range of the parasite. This is the first report of the parasite on emmer (*Triticum dicoccum*) and the first record in this country of its attacking rye, oats, and spelt (*T. spelta*). No infections were noted on barley.—*C. S. Reddy.*

1265. Carpenter, C. W. Preliminary report on root rot in Hawaii (Lahaina cane deterioration, pineapple "wilt," taro rot, rice root rot, banana root rot). Hawaii Agric. Exp. Sta. Press Bull. 54. *9 p. Pl. 1-8.* 1919.—Studies indicate that the Lahaina disease (root rot) of sugar cane, pineapple "wilt," taro rot, banana center leaf necrosis (root rot), and a root rot of rice appear to be caused by a parasitic fungus with a definite mycelium and of the *Pythium debaryanum* type. This root rot fungus is tentatively considered as identical with *Pythium debaryanum.* Characteristic symptoms of the disease were developed in sugar cane by inoculation with pure cultures of the fungus under observation.—*J. M. Westgate.*

1266. Carsner, Eubanks. Susceptibility of various plants to curly-top of sugar beet. Phytopath. 9: 413-421. *7 fig.* 1919.—*Chenopodium murale* and *Rumex crispus*, being non-susceptible to curly-top, make excellent food plants for rearing non-virulent leaf hoppers (*Eutettix tenella*), while the chickweed (*Stellaria media*), being very susceptible, is the most suitable for rearing virulent hoppers. The disease has been produced on 14 species of plants included in eight different families and has been crossed back from 12 of these to healthy beets. Hoppers retained virulence after being kept on non-susceptible plants 111 days. Diseased plants of the red-stem filaree (*Erodium cicutarium*), which is a common California winter plant and a food plant of the hopper, have been found in or near beet fields in late summer, fall, and early spring. This species probably plays an important rôle in overwintering the virus and in furnishing a source of the same to the brood of hoppers attacking beets in the spring.—*J. C. Walker.*

1267. Chandler, W. H. The effect of cold winter of 1917-18 on the fruit industry. Trans. Indiana Hortic. Soc. 1918: 91-103. *1 pl.* 1919.—See Bot. Absts. 4, Entry 908.

1268. Coerper, Florence M. Bacterial blight of soybean. Jour. Agric. Res. 18: 179-193. *Plate A (colored) and 12-18, 1 fig.* 1919.—Soy bean, *Glycine hispida*, at Madison, Wisconsin, is subject to an undescribed disease. Lesions on leaves are small, angular spots either isolated or confluent. At first they are light-colored and translucent but later become very dark. The affected tissue may become dry and drop out giving the leaves a ragged appearance. Lesions occur also on petiole, stem and pod.—Disease is caused by *Bacterium glycineum* n. sp. which is able to make entrance without wounds. The organism is a medium-sized rod, motile by from 1 to several polar flagella. Its cultural characters are presented in detail. The group number assigned is 222.2223032; optimum growth 24 to 26°, maximum 35°, minimum, under 2°. Infection is secured by spraying water suspensions of the organism upon plants. —*D. Reddick.*

1269. Cotton, A. D. Potato diseases. Jour. Bd. Agric. Great Britain Suppl. 18: 28-48. *Fig. 1-18.* 1919.—A brief popular description including control measures is given of all the diseases that affect potatoes in Britain.—*M. B. McKay.*

1270. Cotton, A. D., and H. V. Taylor. The causes of decay in potato clamps, with special reference to the season 1918. Jour. Bd. Agric. Great Britain Suppl. 18: 48-60. *Fig. 19.* 1919.—An exceptional amount of rotting potatoes in clamps in Britain occurred in 1918-19 due to the following most frequent and most important causes which are briefly discussed: (1) Blight rot due to *Phytophthora infestans:* wet rots due to bacterial decay of tubers (2) flooded or waterlogged previous to clamping, (3) injured by frost previous to clamping, (4) affected by blackleg bacillus (*B. atrosepicus*), (5) brought about by the heating of the clamp, or (6) as a result of the penetration of the clamp by frost; and (7) a dry rot due to *Fusarium caeruleum.*—Suggested methods of control include the clamping of only sound tubers, care in the construction of the clamp, the provision of ample ventilation, and periodical inspections of the clamp to detect and check any unfavorable developments.—*M. B. McKay.*

1271. Crocker, William. Wound callus and bacteria tumor. [Rev. of: Magnus, Werner. Wund-Callus und Bakterien-Tumore. Ber. Deutsch. Bot. Ges. 36: 20-29. 1918 (See Bot. Absts. 2, Entry 610).] Bot. Gaz. 67: 516-517. 1919.

1272. Dana, B. F. A preliminary note on foot-rot of cereals in the Northwest. Science 50: 484-485. Nov., 1919.—The disease in question was first observed on wheat growing at Olympia, Washington. The infected plants, showing elliptical lesions at the base of the stem had dead roots at the first node, and were sickly in growth as well as yellow in color. Later reports, especially from Cowlitz County, showed that the same disease was responsible for uneven stands with considerable lodging. The disease has since been reported from several other counties. Microscopic examination of the fungus showed that the mycelium agrees fairly well with *Rhizoctonia Solani* Kuhn., except that the hyphae are only about one half as large. No fruiting stage of the fungus has been connected with the sterile stage on the culms of the cereals. There seems to be a close similarity between the disease as it occurs in Washington, and the foot-rot of cereals caused by *Ophiobolus graminis* Sacc., as described by McAlpine and others.—*A. H. Chivers.*

1273. Department of Horticulture, Purdue University, Experiment Station. Apple spraying and spray materials. Trans. Indiana Hortic. Soc. 1918: 355-363. 1919.—Directions for preparation and application of sprays.

1274. Doidge, Ethel M. Diseases of stone fruit trees. 2. Freckle or scab (Cladosporium carpophilum Thum). South African Fruit Grower 6: 271-273. *1 fig.* 1919.

1275. Doidge, Ethel M. Diseases of stone fruit trees. 3. Brown rot or fruit mold, Sclerotinia fructigena (Pers.) Schroet. South African Fruit Grower 6: 305. 1919.

1276. Doolittle, S. P., and W. W. Gilbert. **Seed transmission of cucurbit mosaic by the wild cucumber.** Phytopath. 9: 326-327. 1919.—Seed from wild cucumber (*Micrampelis lobata*) affected with mosaic was saved in 1918 and planted in 1919. Thirteen out of 110 plants developed mosaic. Cross inoculations to healthy plants resulted in the production of mosaic. —*R. E. Vaughan.*

1277. Dowson, W. J. **Annual report of the mycologist for the year ending 31st March 1917.** Dept. Agric., British East Africa Ann. Rept. 1916-1917: 81-85. 1918.

1278. Duggar, B. M., and Anne W. Davis. **See disinfection for pure culture work; the use of hypochlorite.** Ann. Missouri Bot. Gard. 6: 159-170. 1919.—See Bot. Absts. 4, Entry 1609.

1279. Ehrenberg, P. **Zur Frage der Beizung des Winterweizens gagen Steinbrand. [Disinfection of winter wheat seed against bunt.]** Fühl. Landw. Zeitg. 67: 425-432. 1918.—Smut was so abundant in parts of Brandenburg that flour was ruined.—Experiments for control were performed with "Uspulun" (Chlorphenol compound of mercury) as offered by Friedr. Bauer & Co. 50 grams uspulun in about 8 liters of water sprayed over 100 kilos of seed; seed covered for 7 hours, spread out to dry and seeded through disinfected machine. In one test untreated seed gave 60 per cent smutted heads, treated, 21 per cent; in another, untreated gave 17.8 per cent, treated 3.7 per cent. Results not entirely satisfactory. Possibly seed should be dipped rather than sprinkled. The material would be easier to use if put out in more concentrated form.—*D. Reddick.*

1280. Esmarch. **Über den Wundverschluss bei geschnittenen Saatkartoffeln. [Wound healing in cut seed potatoes.]** Fühl. Landw. Zeitg. 67: 253-256. 1918.—See Bot. Absts. 4, Entry 2410.

1281. Ewart, A. J. **The cause of bitter pit.** Proc. Roy. Soc. Victoria (N. S.) 30^1: 15-20. 1917. [Received in 1919.]—McAlpine's bursting cell theory and vascular interruption theory in regard to the causes of bitter pit are discussed and refuted on the ground of data obtained by the author and by Dr. White. The latter worker who advanced the view that bitter pit is a symptom of slow local poisoning, also considers that it is not confined to fruits such as apple and pear, but may occur in leaves and stems and may be produced artificially by the direct application of poisons. The author cites also the occurrence of brown spongy patches of dead tissue, unaccompanied by disease organisms, which are found in potatoes grown in newly cleared acid soils, and also the disease known as "brown fleck" as possible further instances of natural poisoning. A summary of the evidence in favor of the poison theory of the origin of bitter pit is given. It is pointed out that every symptom of bitter pit can be produced by the artificial application of poisons, including the typical occurrence of starch grains in the dead cells. In apples sensitivity was very great. The poisoning may be oligodynamic, i.e., it may occur in the presence of mere traces of poison. More bitter pit has been found in heavily sprayed orchards than in those not thus treated. A close correspondence between resistance to poison and resistance to bitter pit was noted. This holds also in relation to temperature effects. Both bitter pit and poisoning are retarded by low temperature. In discussing the browning of bitter pit tissues it is pointed out that browning is due to the addition of the oxidase, liberated from the dying protoplasm, upon the tannic acid of the cell sap. Dfferent varieties of apples vary in the degree of browning. The differences in the amount of tannic acid present are not sufficient to account for this. Testing with a dilute solution of amidol showed marked differences in the amounts of oxidase present. It was suggested that the oxidase content might serve to some extent to distinguish certain varieties of apples.—*Eloise Gerry.*

1282. Eyre, J. Vargas, E. S. Salmon, and L. K. Wormald. **The ammonium polysulphide wash.** Jour. Bd. Agric. Great Britain 26: 821-822. 1919.—Directions are given for the preparation of a stable, concentrated solution of ammonium polysulphide containing as much as 21.9 per cent of polysulphide sulphur.—*M. B. McKay.*

1283. Faull, J. H. **Manual of tree diseases.** [Rev. of: Rankin, W. Howard. **Manual of tree diseases.** *398 p. 7 fig.* Macmillan Co.: New York, 1918.] Bot. Gaz. 67: 369. 1919. —This is the first American book on the diseases of forest trees, and it will be welcome because containing the only available summary of such diseases. A contribution of prime importance is that the book points out the direction that should be followed by subsequent investigations. [See Bot. Absts. 2, Entry 782.]—*H. C. Cowles.*

1284. Federal Horticultural Board, U. S. Dept. Agric. Ann. Rept. Fed. Hortic. Bd. 1918. *32 p.* 1919.—Attempts to eradicate pink boll worm of cotton in eastern Texas apparently have been successful. A new infestation in western Texas has been brought under control. Aeroplanes were used for locating cotton fields in this section which is wooded and sparsely settled.—European corn borer is now thought to have been introduced into the United States in 1910 on Hungarian broom corn.—Potato wart (*Chrysophlyctis endobiotica*) has been located in new areas in Pennsylvania and has been found in West Virginia. Irish Cobbler and Rose 4 varieties of potato were apparently immune. Immune varieties from the British Isles are being brought in for propagating stock.—Flag smut (*Urocystis tritici*) and take-all (*Ophiobolus graminis*) have been found in the United States. Efforts are being made to eradicate the diseases in the limited areas in which they occur by burning straw and stubble, disinfection of the grain and of the separators, and elimination of the growth of wheat in the infested areas for a period of years.—There are also included in this report: data on country of origin and nature of nursery-stock importations, and on distribution of such stock in the United States; inspection of imported plants and plant products; need for enlargement of port inspection service.—A list of current quarantines and other restrictive orders is given. —*D. Reddick.*

1285. Fennel, E. A., and M. A. Fisher. **Adjustment of reaction of culture medium.** Jour. Infect. Diseases 25: 444–451. 1919.—See Bot. Absts. 4, Entry 1451.

1286. Florin, R. **Om äppleträdens skorvsjuka och dess bekämpande.** [**Apple scab and its control.**] Sveriges Pomolog. fören. Arsskr. 1918: 69–76. *9 fig.* 1918.

1287. Foex, Et. **Une maladie des Epinards.** [**A disease of spinach.**] Bull. Soc. Path. Vég. France 6: 35–36. 1919.—A disease of spinach (*Spinacia oleracea*) is briefly described. It seems to show close resemblance to the American spinach blight. The work of McClintock and Smith is referred to.—*C. L. Shear.*

1288. Foex, Et. **L'oidium brun des Euphorbes.** [**The brown Oidium of Euphorbia.**] Bull. Soc. Path. Vég. France 6: 31–34. 1919.—See Bot. Absts. 4, Entry 1097.

1289. Fromme, F. D., and G. S. Ralston. **Dusting experiments in peach and apple orchards.** Virginia Agric. Exp. Sta. Bull. 223. *16 p. Fig. 1–2.* 1919.—The work was conducted during the season of 1919 in four orchards on four varieties of peaches and two varieties of apples. Two dusting mixtures were used on peaches, a 90 sulfur–10 lead arsenate, and a 50 sulfur–40 filler–10 lead arsenate Both gave satisfactory control of curculio and scab (*Cladosporium carpophilum*) but neither provided a satisfactory control of brown-rot (*Sclerotinia cinerea*) the percentage of brown-rot ranging from 24 to 45 per cent in the dusted plots of the Champion variety to 53 per cent in the check. A Bordeaux dusting mixture and a 90 sulfur–10 filler–10 lead arsenate mixture were used on apples. Both of these proved very unsatisfactory in the control of bitter rot (*Glomerella cingulata*) on the Albemarle Pippin variety, 76 per cent of the fruit being affected in the plot receiving Bordeaux dust, 63 per cent in the 90–10–10 plot, 9 per cent in the plots sprayed with Bordeaux mixture, and94 per cent in the check. Both dusting mixtures gave satisfactory control of codling moth and proved as efficient as the liquid. Bordeaux dust gave a very satisfactory control of blotch (*Phyllosticta solitaria*) and leaf-spots (*Sphaeropsis malorum*) on the Ben Davis variety, the amount of blotch on the fruit being reduced from practically 100 per cent in the check plot to 4 per cent in the dusted plot.—*F. D. Fromme.*

1290. Girola, Carlos D. **Maices argentinos y aclimatados: Variedades de Maíz cultivadas en Argentina.** [Varieties of maize cultivated in Argentina.] *160 p., 35 pl.* Buenos Aires, 1919.—See Bot. Absts. 4, Entry 71.

1291. Greene, Laurenz. **Spraying a necessity.** Trans. Indiana Hortic. Soc. 1918: 161–173. 1919.—Popular.

1292. Grisdale, J. H. **Report of the acting Dominion botanist.** Rept. Dominion [Canada] Exp. Farms 1917–18: 38–41. 1918.—Administrative report with mention of the work being done in the Field Laboratories of Plant Pathology.—*D. Reddick.*

1293. Guba, E. T., and P. J. Anderson. **Phyllosticta leaf spot and damping off of snapdragons.** Phytopath. 9: 315–325. 1919.—Symptoms of the disease and cultural characteristics of *Phyllosticta Antirrhini* on *Antirrhinum majus* are given. Wounding is not necessary for infection. High air and soil humidities favor a severe attack of the fungus. All types of the disease except the damping off may be controlled by the use of Bordeaux mixture (4:4:50).—*H. Johann.*

1294. Güssow, Hans Theodor. **Report of the Dominion botanist.** Rept. Dominion [Canada] Exp. Farms 1916–17: 40–41. 1918.—Official report of the activities of the department including among other things very brief statements about potato diseases and about club root of crucifers.—*D. Reddick.*

1295. Harter, L. L. **Sweet potato diseases.** U. S. Dept. Agric. Farmers' Bull. 714. *24 p., 15 fig.* 1919.

1296. Hartley, Carl, T. C. Merrill, and Arthur S. Rhodes. **Seedling diseases of conifers.** Jour. Agric. Res. 15: 521–558. *Pl. B.* 1918.—Damping off is the most serious disease of very young seedling conifers. *Corticium vagum*, *Pythium debaryanum* and *Fusarium moniliforme* have proved especially virulent on seedlings of *Pinus* when grown in heated soil. Other organisms which are believed to cause damping off are *Fusarium ventricosum*, *F. solani*, *F.* spp., *Trichoderma* spp., *Botrytis cinerea* and *Pestalozzia funerea*. *Corticium vagum* is reported from 12 coniferous hosts. One strain, maintained in artificial culture for 8 years, retained its virulence. Other strains are practically saprophytes. These differences bear little or no relation to the host from which the strain was isolated. *C. vagum* was found to be especially virulent on pines grown in a very sandy soil which was first treated with sulfuric acid and this followed by lime.—Numerous fungi were tested and found to lack parasitic ability.—Heavy inoculation on seedlings grown in sterilized soil does not give reliable indication of what goes on in the seed bed.—*Corticium vagum* and *Pythium debaryanum* often attack germinating seeds and kill then.—Non-parasitic troubles, with which damping off might be confused, are described and illustrated.—*D. Reddick.*

1297. Haskell, Royal J. **Fusarium wilt of potato in the Hudson River Valley, New York.** Phytopath. 9: 223–260. *Pl. 13–15.* 1919.—Tubers from infected vines show the usual browning of the vascular system and also a net necrosis which the author terms Fusarium necrosis. Isolations of *Fusarium oxysporum* were obtained from the extreme stem end but negative results were reported from the discolored interior tissue. A somewhat similar necrosis was produced experimentally by injections into the rhizomes of growing tubers with toxic solutions such as oxalic acid and a liquid extract of *F. oxysporum*. The author concludes that Fusarium necrosis may be explained by the presence of toxins. Temperature studies show high temperatures to be favorable for the parasite and unfavorable for the host. Artificial inoculations of plants growing at 36°C. gave the best results. A distinct correlation was found between the amount of disease in Dutchess County and the factors influencing soil temperatures. Experimental plantings of seed tubers affected with Fusarium necrosis show that the disease may be communicated in this way but plants free from wilt are often produced. "The plants arising from such potatoes however are weak and the yield is small." Spindling sprouts are

often produced from such tubers. The soil is found to be the chief source of inoculum and the roots are the principal mode of entrance. The destruction of roots is the primary reason for the early death of affected plants.—*R. W. Goss.*

1298. Hawkins, Lon A., and Rodney B. Harvey. **Physiological study of the parasitism of Pythium debaryanum Hesse on the potato tuber.** Jour. Agric. Res. 18: 275-297. *Pl. 35-37.* 1919.—*Pythium debaryanum* destroys the pentosans, starch and sugar of potato in rotting it. It secretes a toxin which kills the cells and an enzyme which breaks down the middle lamellae but affects little or not at all the secondary thickenings. The varieties Bliss Triumph and Green Mountain are very susceptible; White McCormick is highly resistant. Correlated with this it is found that more pressure is required to puncture the tissues of the latter variety than of the former two. The latter variety likewise shows a higher crude fiber content which is thought to be due to more secondary thickening in the cell walls. Mechanical pressure exerted by the hyphae seems to be the most important factor in cell-wall penetration, and resistance to infection is apparently due to resistance of cell walls to mechanical puncture. Osmotic pressure within the mycelium, determined by plasmolysis, is sufficient to develop the pressure necessary to puncture the cell walls in the tubers in all cases but one in which infection occurred; but it was not sufficient (with 3 exceptions) to develop the pressure necessary to puncture the tissues of tubers in cases where no infection occurred.—*D. Reddick.*

1299. Heinricher, E. **Über tötende Wirkung des Mistelschleims auf das Zellgewebe von Blättern und Sprossen. [The killing action of the mucilage of mistletoe seeds upon tissues of leaves and shoots.]** Sitzungber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 815-836. *Pl. 1-3.* 1917.—While attempting to germinate seeds of *Viscum album* upon young shoots of *Impatiens balsamina* with the hope of developing primary sinkers in the host tissue for demonstration purposes, the author found that the tissue under the seeds was killed by the mucilaginous covering of the seed. The same effect was also produced by placing seeds upon the leaves of *Impatiens* and *Pelargonium inquinans.* The mucilaginous covering of the seeds of *Viscum* is composed of an outer cellulose layer and an inner pectose layer. The pectose layer causes the death of the tissues. Other seeds and fruits with mucilaginous coverings were used and it was found that the viscid material about the fruit of *Anthurium scandens* produced a similar effect to that of *Viscum.* The tissue underneath the seeds is killed directly and by killing the veins the tissue supplied by these may also be killed. Germinating seeds of *Viscum* which had the mucilaginous covering removed did not cause death of the tissue. The nature of the effect of this substance depends upon its physical structure and colloidal nature. It is suggested that this colloidal substance may cause osmotic disturbances and water loss from the tissues or by absorption may withdraw water from the tissues and thus cause the injury resulting in their death.—*W. C. Muenscher.*

1300. Hesselman, Henrik. **Om törskatesvampens spridning. [The spread of the fungus, Peridermium pini.]** Skogen 6: 9-16. *Fig. 1-4.* 1919.—This disease is ranked among the worst enemies of the pine in Sweden.—*G. A. Pearson.*

1301. Hoerner, G. R. **Biologic forms of Puccinia coronata on oats.** Phytopath. 9: 309-314. *Pl. 19-20, 4 fig.* 1919.—On the basis of the action on Green Russian and Ruakura Rust Proof oats, of strains of *Puccinia coronata* collected on *Avena sativa* and *Rhamnus cathartica* in various localities of the United States, four distinct biologic forms of the rust can be distinguished. The suggestion follows that apparent immunity of a variety of the host may really mean the absence in that locality of a biologic form capable of producing infection, making the breeding problem a local one.—*G. Wineland.*

1302. Höhnel, Franz V. **Fragmente zur Mykologie XIX. Mitteilung Nr. 1001-bis 1030. [Mycological Fragments XIX, 1001-1030.]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 283-352. *Fig. 1-19.* 1917.—See Bot. Absts. 4, Entry 1111.

1303. Höhnel, Franz V. **Fragmente zur Mykologie XX. Mitteilung Nr. 1031–1057. [Mycological fragments XX. 1031–1057.[** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) **126:** 353–399. *Fig. 1.* 1917.—See Bot. Absts. 4, Entry 1112.

1304. Hunt, Chas. M. **Citrus scab: cause and cure.** Florida Grower **20:** 8. Nov. 8, 1919.—Brief description of the disease with recommendations for control by spraying is given.—*H. R. Fulton.*

1305. Jackson, V. W. **Rusts and smuts of grain crops.** Manitoba Farmers' Library Ext. Bull. 44. *35 p. 25 fig.* Nov., 1919.—In a popular bulletin discussing grain diseases, especially Black Stem Rust (*Puccinia graminis*) and cereal smuts, the writer records the numbers of *Berberis vulgaris* found to date in Manitoba and states that none occur wild. Germination of urediniospores of *P. graminis* from *Hordeum jubatum* was obtained weekly from October 15 to March 15—"after which time it is difficult to find spores or to get viable ones." The writer concludes that urediniospores continue on wild barley until the next wheat crop. A diagram showing dates of appearance of black stem rust in various parts of Manitoba is given for the year 1916.—Data on seed injury by formaldehyde and copper sulphate are given.—*G. H. Coons.*

1306. Jehle, R. A., J. W. Goodman, and J. W. Lindley. **Control of late blight of tomatoes (Phytophthora infestans) in the Blue Ridge Mountains.** Bull. North Carolina Dept. Agric. **40**[11]: 3–16. *7 fig.* 1919.—This paper is a report of coöperative experiments conducted in western North Carolina on the control of late blight of tomatoes. This disease is very destructive in sections whose altitude ranges from 3500 to 4500 feet, but was very successfully controlled by spraying with 5–5–50 Bordeaux mixture. At lower altitudes, where Septoria leaf spot (S. lycopersici) was present, the use of resin-fish-oil soap Bordeaux gave better control than did Bordeaux alone.—*F. A. Wolf.*

1307. Johnston, J. R. **Diseases of sugar-cane in tropical and subtropical America, especially the West Indies.** West Indian Bull. **16:** 275–308. *Pl. 1–7.* 1918.—Descriptions and illustrations of common fungus diseases of sugar cane in America. A bibliography is appended.—*C. V. Piper.*

1308. Jones, L. R., and H. H. McKinney. **The influence of soil temperature on potato scab.** Phytopath. **9:** 301–302. 1919.—High soil temperatures are shown to be favorable to the development of potato scab due to the parasite *Actinomyces scabies.* Experimental results harmonize with observations in Europe and the United States.—*R. E. Vaughan.*

1309. King, A. M. **Notes on the genus Balansia.** South African Jour. Sci. **15:** 670–673. *Pl. 25, fig. 1–4.* 1919.—See Bot. Absts. 4, Entry 1116.

1310. Lagerberg, Ivar. **Vergleichende Untersuchungen über die Widerstandsfähigkeit der Sporen und der vegetativen Formen einiger sporenbildender Bakterien gegenüber ultraviolett Licht. IV. Mitteilung über die Wirkung der ultravioletten Strahlen. [Comparative studies of the resistance of spores and vegetative forms of spore-forming bacteria to ultra-violet light. IV. On the action of ultra-violet rays.]** Zeitschr. Immunitätsforsch. u. Exp. Therapie **28:** 186–197. 1919.—See Bot. Absts. 4, Entry 1598.

1311. Lamkey, E. M. R. **A consideration of yellows.** Proc. Amer. Carnation Soc. **26:** 25–35. 1917.—"Yellows," which appears as a mottled chlorosis of the leaf, is said to be a physiological trouble. A study of the internal structure and physiological processes of diseased plants shows the stomata to be closed, a reduction in quality or quantity of diastase resulting in starch accumulation, and an excessive production of oxidase which interferes with certain physiological functions. A temperature or other environmental relation is suggested by the fact that a diseased plant seems to recover, at least for a time, in the field. Badly yellowed cuttings give yellowed plants, while supposedly healthy cuttings give a few diseased plants. The disease appears to be of an infectious, but not contagious, nature.—*L. M. Massey.*

1312. Leach, Julian G. **The parasitism of Puccinia graminis tritici Ericks. and Henn. and Puccinia graminis tritici-compacti Stak. and Piem.** Phytopath. 9: 58-88. *Pl. 4-6.* 1919.—Extensive experiments with these strains on seventy-two hosts indicate a narrower host range for *tritici-compacti.* The explanation seems to be that hard spring wheats are genally resistant while soft winter wheats are quite susceptible. Hard winter wheats show a varying resistance to *tritici-compacti*; but none of these wheats is resistant to *tritici.* A number of wheats are listed which show a distinct difference in behavior to the two rusts and may be classed as differential hosts. The experiments also show *tritici-compacti* to be a distinct and constant biologic form not changed by the use of bridging hosts, and that such biologic forms have specific food requirements, conforming to the molecular configuration of the protoplasm; and resistance can be explained on this basis.—*E. M. Gilbert.*

1313. Lehenbauer, P. A. **The controlof carnation stem rot.** Florists' Exchange 49: 253, 316, 318. 1920.—In the greenhouses of Illinois, the stem rot produces an average annual loss of 2.3 per cent of the carnation (*Dianthus caryophyllus*) crop. In the field the disease is still more destructive. The causal organism (*Rhizoctonia*) is widely disseminated as a soil fungus. Under field conditions no control is known. Treatment of greenhouse soils with sulphuric acid, lime, Bordeaux mixture, copper sulphate, and formalin has been ineffective. Soil sterilization has not produced satisfactory control due to the frequency of introduction of the fungus from outside sources, particularly in the soil carried on the roots of plants. Since a relatively high temperature is necessary for infection, and since wet soil seems to favor the disease, it is believed that the lowering of the temperature of the greenhouse and the limiting of the water supply will prove to be the most effective control measures.—*C. W. Bennett.*

1314. Leone, G. **Ancora del marciume radicale degli agrumi in Tripolitania. [Further remarks on the root rot of orange in Tripoli.]** Agric. Colon. Firenze 13: 354-355. 1919.—An unidentified nematode resembling *Tylenchus semipenetrans* has been found in roots of orange trees suffering from root rot. The presence of the disease in a young orchard planted on loose, deep soil and receiving only a small water supply tends to invalidate the author's previous theory that the disease is caused by excessive irrigation.—*E. K. Cash.*

1315. Levine, Michael. **Studies on plant cancer.—I. The mechanism of the formation of the leafy crown gall.** Bull. Torrey Bot. Club 46: 447-452. *2 pl.* 1919.—Testing the hypothesis of E. F. Smith that inoculation of *Bacterium tumefaciens* into regions of totipotent cells gives rise to leafy shoots which were comparable to a typical teratoid embryomata, the author inoculated *Bryophyllum calycinum* with *B. tumefaciens*, (1) into the leaf notches which normally produce leafy shoots readily, (2) into the leaf near the notches, (3) into the midribs of the leaf, (4) into the growing regions of the stems of young plants.—In all cases it was found that *B. tumefaciens* does not cause the formation of leafy shoots but rather inhibits and retards their normal development and that the pathological condition which does develop is the ordinary crown gall.—*G. H. Coons.*

1316. Mackie, W. W. **Seed treatment for the prevention of cereal smuts.** California Agric. Exp. Sta. Circ. 214. *8 p.* 1919. The details of the methods of seed treatment with copper sulphate and with formaldehyde solutions are given, with a brief discussion of their relative merits under different conditions.—*H. S. Fawcett.*

1317. Marshall, Roy E., and F. D. Fromme. **Red cedar trees and cedar rust: a report of a cedar rust survey of Augusta county, Virginia.** Virginia Polytechnic Inst. Ext. Bull. 39. *8 p. 1 text fig.* 1920.—The report contains details of a survey of apple orchards planned to determine the relation between severity of cedar rust infection and relative numbers of red cedars within a mile radius, all data on infection being based on the York Imperial variety. Field data are drawn from 113 orchards and harvest records from 44 orchards. The severity of infection was found to be proportional to the numbers of cedars. For purposes of comparison the orchards are grouped in four classes very few cedars, few cedars, many

cedars, and very many cedars. The average yields, grades, and gross returns in each class are shown. In comparison with the group having very few cedars, the losses in the "very-many-cedars" group amount to a reduction of about 80 per cent in yield, 66 per cent in grade and about 90 per cent in value. The losses in the other two classes were intermediate and comparable. The loss in all classes having more than very few cedars is estimated at $7.80 per tree, and is thought to have exceeded one-half million dollars for the county as a whole.—*F. D. Fromme.*

1318. Mayer, Karl. **Die Rotfäule.** [The red-rot.] Forstwiss. Centralbl. 41: 121–127, 185–195. 1919.—See Bot. Absts. 4, Entry 451.

1319. McAlpine, D. **Immunity and inheritance in plants.** Australian Advisory Council Sci. and Indust. Bull. 7: 78–86. 1918.—Address delivered before a conference of agricultural scientists.

1320. McKinney, H. H. **Nomenclature of the potato scab organism.** Phytopath. 9: 327–329. 1919.—See Bot. Absts. 4, Entry 1128.

1321. McRae, W. **A disease of the para rubber tree, caused by Phytophthora Meadii, McR.** Agric. Jour. India 14: 566–577. *Pl. 1.* 1919.—The disease caused by the fungus *Phytophthora meadii* was first noticed in 1909–10. The symptoms are an abnormal leaf fall, following the preliminary reddening or yellowing of the leaves. The green leaves first show dull grey spots of irregular outline with minute drops of coagulated latex towards the interior. Early in the monsoon season ashy-gray spots appear on the fruit of infected trees and gradually cover the whole fruit. After falling of fruit the laterals die back. Usually a bark rot follows. The fungus, *Phytophthora meadii*, is found in all tissues of the affected parts. The hyphae ramify chiefly between the cells and produce sexual cells inside the tissue of the fruits. The sporangia are minute pear-shaped sacks containing usually from 14 to 22 spores. The fungus spreads rapidly in the monsoon season. The preventive measures are cutting away of infected wood and removal of diseased fruit, or destruction of flowers to prevent the formation of fruit.—*J. J. Skinner.*

1322. Melchers, L. E. **A method of steam sterilization of soil for controlling nematodes.** Phytopath. 9: 294–296. 1919.—A method of sterilizing soil in greenhouses is described, by means of introducing the steam underneath a wooden skeleton platform constructed of timbers two inches thick by four inches wide, upon which the soil is piled. By proper arrangement the soil need be shoveled only once, the platform being pulled out and placed in the pit resulting from the removal of the preceding batch of soil. The method is recommended where only low pressure steam is available or where the construction of the greenhouse is such as to render other methods difficult to use.—*J. Johnson.*

1323. Melhus, I. E., and L. L. Rhodes. **A quick method of eliminating seed-borne organisms of grain.** Science 50: 21. July, 1919.—Holding grain in formaldehyde solution at 50°C. as for potato scab is ineffective or destructive to the viability of the seed. In order to overcome these difficulties the grain was suspended just above a formaldehyde solution (1 part in 240 parts water) and the temperature was raised to 98° to 99°C. The time of exposure was shortened to 20 seconds. Under these conditions fungi in or on the seed are killed, and in a majority of cases the bacteria are eliminated. The germinating capacity was not injured. It is believed that the method can be made practicable for the control of scab and other seed-borne diseases of grain.—*A. H. Chivers.*

1324. Murrill, W. A. **A polypore parasitic on twigs of Asimina.** Mycologia 11: 319. 1919.—See Bot. Absts. 4, Entry 1136.

1325. Murrill, W. A. **A field meeting of pathologists.** Mycologia 11: 308–312. *Pl. 15.* 1919.—A field meeting of pathologists, botanists and farm bureau agents lasting several days was held last August at New Haven, Storrs and elsewhere for the discussion of prob-

lems confronting Connecticut farmers. The evenings were devoted to brief papers and discussions and the mornings and afternoons to visits to various farms. Among the subjects discussed was "Peach Yellows," presented by G. P. Clinton, who expressed the belief that it is probably an enzymotic disease which can be transmitted by grafting.—*H. R. Rosen.*

1326. Murrill, W. A. **A meeting of pathologists on Long Island.** Mycologia 11: 320-321. 1919.—A brief note telling of a meeting of plant pathologists to study potato diseases.—*H. R. Rosen.*

1327. Nowell, W. **Red ring disease of coconuts.** Agric. News [Barbados] 18: 398. 1919. —This is a report read in Trinidad giving further notes on the nature of this disease. The author brings out the additional fact that the existence of the disease in the roots is only secondary, and the center of infestation is the red zone in the stem which is the feeding ground of the nematodes. While much detail work remains to be done, it seems probable that the worms are introduced with the seed nuts. Infestation may also take place among the leaves without previous injury, quite possibly from dry infected material blowing about or from worms gaining access to the leaf bases of young trees from the soil.—*J. S. Dash.*

1328. Nowell, W. **The cacao canker fungus as a cause of coconut bud rot.** Agric. News [Barbados] 18: 414. 1919.—Coconut bud rot in British Guiana and Trinidad may be induced by mechanical, chemical, or parasitic interferences with life processes of the palm. In this connection Reinking's work in assigning to *Phytophthora faberi* causal relation to the bud rot of coconuts found in the Philippine Islands is compared with Johnston's observations with *Bacillus coli* and Ashby's observations on the relation of *Phytophthora palmivora* to bud rot. —*J. S. Dash.*

1329. O'Byrne, F. M. **Spraying in a nursery.** Florida Grower 20: 8. Nov. 8, 1919.— Discussion of the equipment and spray materials useful in citrus nurseries is presented. The insecticidal and fungicidal efficiency of spraying is demonstrated by experimental data.— *H. R. Fulton.*

1330. Oskamp, Joseph. **Some newer phases of disease and insect control.** Trans. Indiana Hortic. Soc. 1918: 33-42. 1919.—The spray gun saves time, but it is questionable if its efficiency is equal to that of the spray rod. Dry lime-sulphur is easier to handle than the liquid and appears to give as good control of apple scab (*Venturia inaequalis*). Calcium arsenate is equal to lead arsenate as an insecticide and if combined with an equal amount of freshly slaked lime will not burn apple foliage. Dusting with sulphur necessitates a higher cost of materials and a lower cost of labor than spraying but does not control scab and blotch (*Phyllosticta solitaria*) so successfully. A dormant spray of concentrated lime-sulphur has been used for blotch control but the results are negative.—*Max W. Gardner.*

1331. Palm, Bj. **Eenige ziekten waargenomen aan de tarwe op Java. [Some diseases observed on wheat in Java.]** Dept. Landbouw, Nijverheid en Handel, Meded. Lab. Plantenziekten Buitenzorg 34: 1-20. *Pl. I (colored), fig. 1-12.* 1918.—Observations and a popular description are given for the following diseases which were found in experimental plots from seed imported from India, Europe, and other countries: Loose smut (*Ustilago tritici*, Scurf (*Gibberella saubinetii* = *Fusarium rostratum*), *Helminthosporium* diseases (*H. gramineum* and *H. geniculatum*, and the *Nigrospora* disease (*N. panici*). The smut and scurf were not previously reported in Java and are believed to have been recently introduced on imported seed. The *Nigrospora* which has apparently not been observed outside of Java causes but slight damage and is also found on rice and maize.—*R. D. Rands.*

1332. Parker, John H. **A preliminary study of the inheritance of rust resistance in oats.** Jour. Amer. Soc. Agron. 12: 23-38. 1920.—See Bot. Absts. 4, Entry 692.

1333. Patton, R. T. **Timber production and growth curves in the mountain ash (Eucalyptus regnans).** Proc. Roy. Soc. Victoria (N. S.), 30[1]: 1–3. *Pl. 1–2, fig. 1–4.* 1917. [Received 1919.]—See Bot. Absts. 4, Entry 456.

1334. Pethybridge, G. H. **Notes on some saprophytic species of fungi, associated with diseased potato plants and tubers.** Trans. British Mycol. Soc. 6: 104–120. *Pl. 3, 4.* 1919.—See Bot. Absts. 4, Entry 1152.

1335. Pethybridge, G. H., and H. A. Lafferty. **A disease of tomato and other plants caused by a new species of Phytophthora.** Sci. Proc. Roy. Dublin Soc. 15: 487–503. *3 pl.* 1919.—A disease causing a rot of the root system and lower portion of the stem of young tomato plants is described and named "Tomato-foot Rot." A species of Phytophthora, isolated from the diseased tissues, was proved to be the cause of the disease. The fungus, grown in pure cultures, was found not to be identical with any of the previously described members of the genus Phytophthora. It was given the name *P. cryptogea.* Petunia is reported as a natural host for this parasite and Aster and Cheiranthus are also suspected. Artificial inoculations show the fungus also to be pathogenic to the potato, to Gilia tricolor and Fagus sylvatica but not to *Senecio vulgaris*, *Helianthus annuus* or *Nicotiana affinis.* The disease was found to be contracted from the soil. It can be prevented by raising tomato plants in soil thoroughly sterilized by heat.—*A. E. Waller.*

1336. Pethybridge, George H., and H. A. Lafferty. **A disease of flax seedlings caused by a species of Colletotrichum and transmitted by infected seed.** Sci. Proc. Roy. Dublin Soc. 15: 359–384. *2 pl.* 1918.—A fungus causing a "damping off" disease of flax seedlings (*Linum usitatissimum*) is described as a new species under the name *Colletotrichum linicolum.* Flax seed from Russia, Holland, Canada, the United States and Japan has been found to give rise to diseased seedlings and it is believed that the disease is widespread over the globe.—*A. E. Waller.*

1337. Putterill, Victor Armsby. **Notes on the morphology and life history of Uromyces Aloes Cke.** South African Jour. Sci. 15: 656–662. *Pl. 22–23, fig. 1–6.* 1919.—See Bot. Absts. 4, Entry 1153.

1338. Ramsey, Glen B. **Studies on the viability of the potato blackleg organism.** Phytopath. 9: 285–288. 1919.—The author concludes that the blackleg organism (*Bacillus atrosepticus*) does not live in tubers that may overwinter in the soil and that there is little chance that uninjured plants will contract the disease even though the causal organism is washed about the stem and root system.—*H. H. McKinney.*

1339. Ravn, F. Kolpin, J. Lind, C. Ferdinandsen, and Sofie Rostrup. **Versigt over Havebrugzstanternes Sygdomme i 1916 og 1917. [Survey of diseases of horticultural plants during 1916 and 1917.]** Tidsskr. Landbrug. Planteavl 26: 298–334. 1919.—Discusses the plant disease situation in Denmark during 1916 and 1917. Diseases due to insects, bacteria and fungi are considered.—*Albert A. Hansen.*

1340. Régnier, Robert. **Sur le chancre bactérien du peuplier (Micrococcus Populi). [Bacterial canker of poplar.]** Compt. Rend. Acad. Sci. Paris 169: 85–88. July 15, 1919.—Observations commenced in 1913 are reported upon a canker of Carolina poplar which is common in the valley of the Oise, France, and which is attributed from the work of Delacroix to a micrococcus. Without advancing further evidence in regard to causation, the writer, from observations in nature, records stages in canker formation and the possibility of insect transference. The severity of the disease makes this disease of parallel importance to that caused by *Dothiciza populea.* Control measures are suggested.—*G. H. Coons.*

1341. Roberts, R. H. **"Crinkle" on Northwestern Greening.** Phytopath. 9: 261–263. *Pl. 16–17.* 1919.—"Crinkle" on Northwestern Greening in 1918 is reported as being a trouble unusual in Wisconsin orchards. The injury is described briefly in relation to its possible

cause. It is stated that there is "a very definite area of susceptibility surrounding the calyx end of the fruit," and that anatomical studies of this area showed it to be relatively inadequately provided with vascular tissue.—*G. W. Keitt.*

1342. Rose, D. H. **Infection as related to humidity and temperature.** [Rev. of Lauritzen, J. I. **The relation of temperature and humidity to infection by certain fungi.** Phytopath. 9: 1–35. 1919. (See Bot. Absts. 3, Entry 2679.)] Bot. Gaz. 68: 66–67. 1919.

1343. Rosen, H R. **Ergot on Paspalum.** Mycologia 12: 40–41. 1920.

1344. Rosenfeld, A. H. **Kavangire: Porto Rico's mosaic disease-resisting cane.** Internat. Sugar Jour. 22: 26–33. 1920.

1345. Rutgers, A. A. L. **Bliksemschade bij Hevea. [Effect of lightning on Hevea.]** Arch. Rubbercult. Nederlandsch-Indië 3: 163–171. 1919.—Four types of lightning injury are discussed. Single trees or groups of trees are killed; or a few trees in a group may be killed, the others showing injury; or strips of bark are killed, in some cases in a spiral around the tree. Vertical lightning scars are sometimes found on the stem, which after healing show characteristic scars that cannot be mistaken. Weeping trees that show a number of small lightning scars high up in the stem are the result of lightning. Finally, the scaling off of the outer bark ("scurf") is probably caused by lightning.—*W. E. Cake.*

1346. Rutgers, A. A. L. **Voorschriften voor de bestrijding van bastziekten bij Hevea uitgegeven door het Algemeen Proefstation der Avros, October 1917. [Instructions for the combating of bark diseases in Hevea.]** Arch. Rubbercult. Nederlandsch-Indië 2: 55–57. 1918.—Abstract in Dutch and English of a circular on the treatment of stripe canker (black thread disease), patch canker, brown bast disease, and burrs, issued by the General Experimental Station of the association of rubber planters of the East Coast of Sumatra.—*H. H. Bartlett.*

1347. Sanders, G. E. **Apple spraying in 1919** (sic). Fruit Growers' Assoc. Nova Scotia Ann Rept. 55: 110–118. 1919.—The dropping of the fruit and burning of the foliage of apple (*Pyrus Malus*) when lime sulphur sprays (particularly the fourth spray) are used is said to have been greater in years 1914, 1915, 1916, and 1917, in which the weather was cold and dull, than in the preceding four years, which were warmer. The following sprays are recommended: (1) Bordeaux mixture (3:10:40); (2) Bordeaux mixture (2:10:40); (3) Soluble sulphur (1:40); (4) Bordeaux mixture (2:10:40). It is stated that at least three parts of lime must be used to one part of copper sulphate.—*Paul A. Murphy.*

1348. Schander, R. **Beobachtungen und Versuche über Kartoffeln und Kartoffelkrankheiten im Sommer 1917. [Observations and investigations of potatoes and potato diseases in 1917.]** Fühling's Landw. Zeitg. 67: 204–226. *1 fig.* 1918.—See Bot. Absts. 3, Entry 2751; 4, Entry 1913.

1349. Schmitz, Henry. **Studies in the physiology of the fungi VI. The relation of bacteria to cellulose fermentation induced by fungi, with special reference to the decay of wood.** Ann. Missouri Bot. Gard. 6: 93–136. 1919.—See Bot. Absts. 4, Entry 1518.

1350. Scofield, C. S. **Cotton rootrot spots.** Jour. Agric. Res. 18: 305–310. *7 fig.* 1919.—Rootrot of cotton (*Phymatotrichum omnivorum*) occurs in well defined areas in cotton fields. When land is cropped continuously to cotton it is found that "the disease does not continue to reappear in successive seasons in the same spots."—Records taken from field plots show that since 1912 there has been a marked increase in the number of plants dying from root rot but the losses from this source were noticeably less in 1917 and 1918 than in 1916.—*D. Reddick.*

1351. Shapovalov, M. **Is the common potato scab controllable by mere rotation of crops.** Phytopath. 9: 422–424. *1 fig.* 1919.—From experiments involving the growth of *Actinomyces scabies* upon filter paper for two years, the author concludes that endeavors to eradicate the scab fungus from the soil by rotation methods are likely to be unsuccessful.—*H. H. McKinney.*

1352. Smith, Annie Lorrain. **Hyphomycetes and the rotting of timber.** Trans. British Mycol. Soc. **6**: 54–55. 1918.—See Bot. Absts. 3, Entry 2763; 4, Entry 1162.

1353. Smith, Annie Lorrain. **Presidential address. The relation of fungi to other organisms.** Trans. British Mycol. Soc. **6**: 17–31. 1918.—See Bot. Absts. 4, Entry 1160.

1354. Smith, Erwin F., and Lucia McCulloch. **Bacterium solanacearum in beans.** Science **50**: 238. Sept., 1919.—In June, 1919, badly diseased bush beans were received from Lynn Haven, Florida. The leaves were wilted and more or less brown, the petioles were brown and wilted to their base. The roots also were brown and the epidermis was decayed in places. Cross sections showed 50 to 100 per cent of the vessels to be full of bacteria, and no fungi were visible. The supposition was that the disease must be due to the bacteria and that they must have entered through the root system. Agar plates gave pure cultures of a white bacterial organism having all the characteristics of *Bacterium solanacearum*. A number of different legumes were inoculated. Of beans; Wax bush, Valentine, Refugee, Lima (Fordhook variety), Pinto and Great Northern. Of peas; Telephone, Little Marvel and Mammoth Luscious Sugar. The organism has been reisolated from both beans and peas (tested on tobacco and beans) and proved to have the same characters and infectiousness as the original culture. Tobacco and tomato plants used for control showed typical *Bacterium solanacearum* infections. Fortunately beans appear to be very susceptible only in early stages of growth.—*A. H. Chivers.*

1355. Smith, Erwin F., L. R. Jones, and C. S. Reddy. **The black chaff of wheat.** Science **50**: 48. 1919.—See Bot. Absts. 4, Entry 1166.

1356. Smith, Ralph H. **A preliminary note concerning a serious nematode disease of red clover in the northwestern states.** Jour. Econ. Entomol. **12**: 460–462. 1919.—A preliminary account of the finding, in May, 1918, infestation of red clover in Idaho by the stem and bulb nematode, *Tylenchus dipsaci*. Information from the farmers indicates that the trouble has been in southern Idaho for several years and that it is rapidly increasing in destructiveness. —The infested parts of the plant near the ground become enlarged, spongy, and finally turn brown and rot off. The worms also occur higher up in the stems, and in the leaves and branches where they cause distortions and enlargements. The effects upon the plants are most pronounced in autumn and early winter. During the summer, the foliage of affected plants usually has an unhealthy, striped, yellow appearance and the plants as a whole are more or less stunted.—*A. B. Massey.*

1357. Snell, John. **Ormskirk potato trials.** Jour. Bd. Agric. Great Britain Suppl. **18**: 68–102. *Fig. 20–33.* 1919.—The testing of varieties of potatoes for immunity to wart disease (*Synchytrium endobioticum*) was continued at Ormskirk during 1918. To date 363 varieties have been tested of which 105 have proved immune, 243 have proved susceptible, and 15 have not been finally classified, being listed for the present as of doubtful immunity. A complete alphabetical list of these three classes of varieties is included in the report.—At Ormskirk, in the past, experiments have been carried out with lime, sulphur, soot, formalin, corrosive sublimate, etc. to kill the spores of the fungus in the soil but none of the substances was successful. This year sterilization of the soil with steam under high pressure for 1½ hours was tested but without success, as every tuber grown from a susceptible variety planted in such soil was badly warted. Tubers grown under similar conditions from the same seed lot but in unsterilized soil presumed to be free from wart disease were all free of any visible trace of the disease. Thus the planting of immune varieties still remains the only known method of combatting what is, perhaps, the most serious disease that has ever attacked potatoes in Britain. —*M. B. McKay.*

1358. Snell, John. **Potatoes: local immune variety trials.** Jour. Bd. Agric. Great Britain Suppl. 18: 103–114. 1919.—A series of trials in 1918 to test the suitability of wart-immune varieties to local conditions in those parts of England and Wales where the wart

disease (*Synchytrium endobioticum*) has become a serious menace to the potato crop. It is evident that amongst the varieties immune to wart, of which Lochar, Ally, Great Scot Kerr's Pink, and Majestic were the best yielding varieties in these tests, "there are potatoes that will yield very heavy crops, and some of them may be classed amongst the heaviest-cropping varieties in cultivation at the present time."—*M. B. McKay.*

1359. Somerville, W. **Ear cockles in wheat.** Jour. Bd. Agric. Great Britain 26: 907–909. *3 fig.* 1919.—A report is given of some brief tests made to determine whether the wheat eelworm (*Tylenchus scandens*) can be successfully controlled by seed treatment. Soaking infested seed in 1 per cent copper sulphate, 0.5 per cent formalin, and 1 per cent formalin for 24 hours in each case did not give perfect control of the eelworm though the germination of the grain was in the case of the formalin treatment greatly reduced. The use of 5 per cent copper sulphate, 0.5 per cent sulphuric acid, and 1 per cent sulphuric acid each for 24 hours gave complete control of the eelworm though, since germination of the grain was reduced 45 per cent or more by the treatments, the use of these solutions is not practical. Wheat infested with eelworms should, therefore, not be used for seed purposes.—*M. B. McKay.*

1360. Spafford, W. J. **Trouble affecting cereals in the Penola district.** Jour. Dept. Agric. South Australia 22: 527–534. 1919.—A serious trouble causing enormous damage to the cereal crops. The plants are affected after they have apparently made a healthy growth of several inches. The trouble first appears in patches resembling water logged crops. The root system is killed and lesions extend up the crown for about an inch. The leaves begin to dry up, and finally many of the plants die. Investigations to establish the cause of this trouble have been carried on for a period of years, but as yet, the causal organism has not been definitely determined.—*Anthony Berg.*

1361. Speare, A. T. **The fungus parasite of the periodical cicada.** Science 50: 116–117. Aug., 1919.—The fungus, *Massospora cicadina* Peck, has been extremely prevalent about Washington, D. C., during the recent appearance of brood X of *Cicada septendecim.* It appears that conidia and resting spores of this fungus are not formed simultaneously in the same insect, and infected individuals bearing only conidia present a different gross appearance from those insects in which only resting spores are produced. The characteristics produced by infection of both conidia and resting spores are described briefly.—*A. H. Chivers.*

1362. Stahel, G. **Über die Infloreszenzen von Theobroma cacao Linn. und Theobroma bicolor Humb. und ihre Umformung unter den Einfluss des Krüllotenschimmels (Marasmius perniciosus Stakel). [Concerning the infloresence of Theobroma cacao Linn. and T. bicolor Humb. and their deformation by Marasmius perniciosus Stakel.]** Ann. Jard. Bot. Buitenzorg 30: 91–114. *8 pl.* 1918.

1363. Stevens, F. L. **Three new fungi from Porto Rico.** Mycologia 12: 52–53. 1920.

1364. Stevens, Neil E. **Keeping quality of strawberries in relation to their temperature when picked.** Phytopath. 9: 171-177. 1919.—See Bot. Absts. 4, Entry 947.

1365. Stone, R. E. **A new stem-rot and wilt of tomatoes.** Phytopath. 9: 296–298. 1919. —This is a greenhouse trouble ascribed to a species of *Botrytis.* The fungus is a wound parasite capable of attacking only under conditions of excessive humidity.—*E. E. Clayton.*

1366. Stone, R. E. **Meeting of the Canadian Branch of the American Phytopathological Society.** Mycologia 12: 43–45. 1920.—Report of the first annual meeting of the Canadian Branch of the American Phytopathological Society. Various papers presented at the meeting are listed.—*H. R. Rosen.*

1367. Swart, N. L. **Jaarverslag 1918. [Report for 1918.]** Mededeel. Rubberproefsta. West-Java, Buitenzorg 12: 1–47. 1919.—During the year much attention was given the brown bast disease [cause unknown] of Para rubber. Approximately 20 per cent of the trees

were found attacked in the older plantations. Both of the common methods for treatment were found satisfactory, i.e., (1) the peeling off of all diseased bark and protecting the cambium until renewal begins, and (2) the scraping away of only the discolored tissue. Die-back and an abnormal leaf fall attributed to Phytophthora during the rainy season were found severe on many plantations.—*R. D. Rands.*

1368. Sylvén, Nils. **Über den Kieferndreher Melampsora pinitorqua (Braun) Rostr. [Melampsora pinitorqua (Braun) Rostr.]** Naturw. Zeitschr. Forst- u. Landw. 16: 118–127. 1918.—*Melampsora pinitorqua* was first known to occur in Sweden in 1874. Examination of several pine twigs infected the previous year showed no living mycelium of the fungus. Nor do old infected spots ever produce new aecia. Infection each spring must come from aspen leaves. The younger the pines, the more destructive is the disease to them. One-year old trees are often killed outright. Older ones lose their leaders, new growth developing. Attacked twigs which remain alive are much bent, often becoming "S"-shaped. In several nurseries a small percentage of the seedlings were affected. Ends of twigs killed by the parasite hang down like frost injured ones. As high as 100 per cent infection occurs under favorable conditions. Various outbreaks are mentioned which have occurred in Sweden, the disease appearing to have become very widespread. Study of these outbreak areas indicate that the factors influencing the spread of the fungus from *Populus* to pines are: openness of location allowing free access of the wind, direction of wind, height of poplar trees, proximity of the two hosts, and exposure of the pines to the wind. The sporidia are distributed only to a limited distance. The author intimates that distribution is largely effected by the urediniospores.—*Perley Spaulding.*

1369. Sylvén, Nils. **1917 Års knackesjuka norra Västergötland. [Melampsora pinitorqua in V. in 1917.]** Medd. Stat. Skogsförsöksanst. 15: 192–204. *Pl. 19–22.* 1918.—A comparative study of the disease caused by *Melampsora pinitorqua* in 1917 and 1916 in northern Västergötland, Sweden. In 1916 it was very abundant and injurious. In 1917 it had almost disappeared. The author attributes this great difference to abundant precipitation in the spring and early summer of 1916 when the fungus from the old *Populus* leaves was infecting the pines; and to a lack of rain at the same time in 1917. A correspondignly low temperature in 1916 and high one in 1917 also is believed to have affected the fungus. It is significant that the years 1873, 1892, 1898 and 1912, when bad outbreaks of the disease occurred, were also characterized by heavy rainfall in May and June. A moist May starts the disease but a moist first half of June greatly increases it in severity and abundance.—*Perley Spaulding.*

1370. Tanaka, Tyôzaburô. **New Japanese fungi—notes and translations. VIII.** Mycologia 12: 25–32. 1920.

1371. Taubenhaus, J. J. **Recent studies on Sclerotium rolfsii Sacc.** Jour. Agric. Res. 18: 127–138. *Pl. 3–6, fig. 1.* 1919.—*Sclerotium rolfsii* is reported as affecting 32 different host plants. "Southern sclerotium rot" is suggested as a common name for the disease produced by it. The range of the fungus is essentially southern and it is found attacking plants grown in light sandy loam as well as vegetable products in storage. The fungus is a true parasite but considerable air and moisture are required for infection. Incubation period 2 to 6 days. Mycelium is in strands or radial fans. Sclerotia vary in size, depending on the host. No physiological specialization has been noted.—*D. Reddick.*

1372. Turley, H. E. **New fruit fungi found on the Chicago market.** Science 50: 375–376. Oct., 1919.—The new fruit diseases found on the Chicago market are: a new *Botrytis* on apple, *Polyscytalum* on grape fruit and *Fusarium* on grapefruit.—*A. H. Chivers.*

1373. van Hall, C. J. J. **Voorloopige Mededeeling over de wortelschimmels van de Thee. [Preliminary account of the root diseases of tea.]** Dept. Landb. Nijv. en Handel. Meded. Proefstation voor Thee (Buitenzorg) 58: 26–27. 1918.—Seven kinds of root diseases are briefly considered and ascribed to the following fungi: *Rosellinia (bothrina?)*, *Rosellinia (bunodes?)*,

Rosellinia sp., *Ustulina zonata*, *Poria hypolateritia*, *Hymenochaete noxia*, and *Armillaria?*—*R. D. Rands.*

1374. van Hall, C. J. J. **Ziekten en plagen der cultuur gewassen in Nederlandsch-Indië in 1917. [Diseases and enemies of cultivated plants in Dutch East Indies in 1917.]** Dept. Land. Nijv. en Handel, Meded. Lab. Plantenziekten Buitenzorg 33: 1–42. 1918.—Unusually heavy rains of the west monsoon were considered responsible for the severe damage to rice and tea from root diseases and the canker of Para rubber. The Phytophthora disease of tobacco was prevalent as was also maize mildew (*Sclerospora javanica*) the latter causing large losses in central and east Java. Detailed notes are given on the distribution and damage caused by the common diseases of the more important crops. A report is appended showing the results of inspections of imported plants and fruits.—*R. D. Rands.*

1375. van Harreveld, Ph. **Stambibittuinen en zeefvatenziekte. [Sugar cane nurseries and the sieve tube disease.]** Arch. Suikerindus. in Nederlandsch-Indië 26: 333–346. Feb., 1918. Also Meded. Proefstation Java-suikerindust. Pasoeroean, Landb. Ser. 1918, No. 4.—This paper considers various points raised in a controversy between J. Sibinga Mulder, (Indische Mercuur September 21, 28 and October 5, 1917), H. M. Quanjer (Indische Mercuur October 12, 1917), and the author. In support of the latter's contention that it is impossible to free the crop from the sieve-tube or Sereh disease by producing the material for planting at high elevations, experiments are cited to show that cane propagated at high elevations for ten years still developed the disease when transferred to the flat land of the plantations. Importations of varieties from many foreign countries in every case also became diseased. Among the different bacteria isolated from diseased cane, one, which may be identical with *Bacillus vascularum*, is considered the probable cause.—*R. D. Rands.*

1376. Vogel, Irvin H. **A rose graft disease.** Phytopath. 9: 403-412. *Fig. 1–6.* 1919.—The occurrence of a serious disease of rose grafts in forcing frames at Council Bluffs, Iowa, in 1916 and 1907 is reported, and the symptoms of the disease are described. *Coniothyrium rosarum*, which was found to be associated with the trouble, was isolated and studied in culture and in its thermal relationships. It is stated that inoculations with this fungus induced the disease on the rose, but gave negative results on the black raspberry, while *C. fuckelii* from the black raspberry failed to infect the rose. Wide differences in varietal susceptibility are noted and control measures are recommended.—*G. W. Keitt.*

1377. von Büsgen, M. **Omnivorie und Spezialisation bei parasitischen Pilzen. [Omnivorous and specialized parasitic fungi.]** Zeitschr. Forst- u. Jagdw. 1919: 144–153. 1919.—A treatise dealing with the probable causes for specialization and the omnivorous habits of various parasitic fungi. Special discussion is given to the results of inoculation experiments with *Botrytis vulgaris*.—*Hermann Krauch.*

1378. Walker, J. C. **Onion diseases and their control.** U. S. Dept. Agric. Farmers' Bull. 1060. *23 p. Fig. 1–12.* 1919.

1379. Weir, James R., and Ernest E. Hubert. **A study of the rots of western white pine.** U. S. Dept. Agric. Bull. 799. *24 p.* 1919.—The fungi causing rot of western white pine (*Pinus monticola*) are mainly *Trametes pini*, *Polyporus schweinitzii* and *Fomes annosus*, the first named being most important. Estimated loss from rot in western white pine area is $7,201,250. A study of factors relating to the cause, spread and control of this rot is based upon data taken from an analysis of about 1400 trees felled in the white pine area. The factors studied are relative age of tree, site, age of infection, injuries and sporophore production. Percentage of infected trees increases consistently as the age classes increase from 41–60 years to 201–years. This correlation is almost identical for both bottom and slope sites the average per cent infection being 55 and 55.3 and the average per cent rot being 7.8 and 6.1 respectively. Although a slightly higher percentage of infection prevails on slope sites the per cent of rot throughout this study is highest on bottom sites. The underlying cause of

this fact is attributed to the wetter, flatter, more poorly drained conditions of bottom sites. Since the earliest age class of trees infected on bottom sites was found to be 71 to 80 years and that on slope sites 61 to 70 years, it is concluded that the earliest age of infection may be safely placed at 50 years. This age of infection is associated with the formation of heartwood and the appearance of injuries susceptible to infection. The period leading up to the earliest age of infection is defined as the one during which greatest precaution should be used in protection from spore infection. Injuries due to broken tops, branch stubs, frost cracks, fire scars, etc. appeared to increase quite consistently with each increase in age class of trees, thus largely accounting for the corresponding increase in rot infection with age. Site was found not to appreciably affect the vitality of sporophores but to have some influence on the number produced. With the higher percentage of rot infection on bottom sites was associated a larger number of sporophores over that found on slope sites. The maximum of sporophore production occurred in the age class of 121 to 160 years. The 101 to 120 age class would, therefore, from the pathological point of view be the proper age class for felling. Felling before the period of maximum sporophore production would appear to be one of the best means of controlling rot infection. Strict observance of pathological marking rules and the removal of infected slash are also recommended as control measures.—*E. V. Hardenburg.*

1380. Wolf, F. A., and E. G. Moss. **Diseases of flue cured tobacco.** Bull. North Carolina Dept. Agric. 40^{12}: 5–45. *24 fig.* 1919.—This popular, illustrated account concerns the appearance, cause, hosts and control of some of the diseases affecting the growing crop. Consideration is given to wilt, root knot, root rot, sore shank, mosaic, frenching, wildfire, angular leafspot, common leafspot, frogeye, and crookneck.—*F. A. Wolf.*

1381. Yamamoto, R. **On the insecticidal principle of Chrysanthemum cinerariifolium.** Ber. Ohara Inst. Landw. Forsch. 1: 389–398. 1918.—See Bot. Absts. 4, Entry 2693.

1382. Young, H. C. **Seed disinfection for pure culture work.** Ann. Missouri Bot. Gard. 6: 147–158. 1919.—See Bot. Absts. 4, Entry 1615.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Heber W. Youngken, *Editor*

1383. Anonymous. **Animal and vegetable rennets. Their properties, their preparation, and their mode of action.** [Translated from F. Faideau, in *LaRousse Mensuel* (Paris)]. Sci. Amer. Supplem. 87: 285. *3 fig.* 1919.—Plants rich in rennet include the wild artichoke (*Cynaria carduncutus*), yellow cheese-rennet (*Galium verum*), common fig, butterwort (*Pinguicula vulgaris*), papaw (*Carica papaya*), (*Witania coagulans*) of India, paper mulberry (*Broussonetia papyrifera*), darnil, lucerne, lupine, euphorbia, madder, etc.—*Chas. H. Otis.*

1384. Anonymous. **Surgical sphagnum in eastern Maine.** Sci. Amer. 121: 5. 1919.

1385. Anonymous. **The castor bean and its many uses.** Sci. Amer. 120: 528, 530. 1919.

1386. Arnold, Julson. **Chinese products of interest to nurserymen.** Nation. Nurseryman 27: 20–21. 1919.—See Bot. Absts. 4, Entry 895.

1387. Hoepner, Karl. **Beitrag zum Nachweis eines unzulässigen Schalengehaltes in Kakaoerzeugnissen. [Inadmissible shell content in cacao products.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel. 37: 18–31. 1919.—Report of examination for impurities of cacao powder from various sources. A shell content of cacao products is inadmissible according to German official standards if (1) the microscopic examination shows a considerable number of cellular elements of shells, (2) the fat-free and sugar-free dry residue contains an ash-free crude fiber content of more than 6 per cent, (3) the fat-free and sugar-free dry substance con-

tains more than 0.1 per cent Fe_2O_3 and more than 0.5 per cent acid-insoluble ash. The percentage of adulteration may be determined roughly by the formula $(X-6) \times 10$, where X is the crude fiber content of the fat-free dry residue. The samples examined from United States, Scandinavian, Dutch and German sources are reported normal; samples from unknown and unmentioned sources were found impure.—*H. G. Barbour.*

1388. Joachimowitz, Marianne. **Bilsenkrautsamen enthaltender Mohn. [Poppy containing henbane seeds.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 183-185. 1919. —In Vienna, among eaters of a poppy meal, an epidemic of poisoning recently occurred (characterized by visual disturbances, throat dryness, and difficulty in swallowing), said to be due to henbane seeds which became mixed with the poppies in the process of mowing and threshing in Russia, whence smuggled. The biological test (dilation of cat's pupil) was found the most practical for identification.—*H. G. Barbour.*

1389. Nichols, F. M. G. W. **Commercial medicinal plants.** South African Jour. Indust. 2: 1081-1084. 1919.

1390. Record, S. J. **Lignum-vitae, the vital wood.** Sci. Amer. Supplem. 88: 4-5, 15-16. *6 fig.* 1919.—See Bot. Absts. 4, Entry 459.

1391. Rupp, G. **Tabak-Ersatzmittel. [Tobacco substitutes.]** Zeitschr. Untersuch. Nahrungs.-u. Genussmittel 37: 370-377. 1919.—See Bot. Absts. 4, Entry 121.

1392. Small, James. **The application of botany in the utilization of medicinal plants.** Pharm. Jour. 103: 199-201, 213-215, 248-250, 294-296. 1919.

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

1393. Beauverie, J. **Revue d'agronomie. [Review of agronomy.]** Rev. Gen. Sci. Pures et Appliquées 30: 370-384, 411-418. 1919.—See Bot. Absts. 4, Entry 26.

1394. Bower, F. O. **Botany of the living plant.** *x + 580 p., 447 fig.* Macmillan & Co.: London, 1919.—This book represents an expansion of the "Course of Elementary Lectures on Botany" given in Glasgow University for 30 years. The object of the work is stated to be "that of presenting the plant as a living, growing, self-nourishing, self-adapting creature." In developing a sequence of topics the author arranges his material in accordance with the idea that it is better to begin with the better known plants (those of larger size and generally familiar) proceeding to those generally smaller and lesser known. Some physiological facts are distributed throughout, but certain chapters (IV, the leaf; V, the root; VI, the water relation; VII, nutrition, storage, and respiration; and VIII, growth and movement) contain more of physiological significance. No citations of literature are included and no collateral reading is suggested. There is a combined index and glossary of 32 pages.—*B. M. Duggar.*

1395. Péchoutre, F. **Revue de botanique. [Review of botany.]** Rév. Gen. Sci. Pures et Appliquées 30: 242-250. 1919.—See Bot. Absts 4, Entry 176.

PROTOPLASM, MOTILITY

1396. Foster, Nathan. **Colloids and living phenomena.** Sci. Monthly 9: 465-473. *Fig. 1-9.* 1919.—Protoplasm consists essentially of water, crystalloids, and colloids. It is immaterial in this discussion of the rôle played by colloids in living reactions whether one's conception of life is vitalistic or mechanistic.—Examples of crystalloids are sugar, salts, fatty acids,

mino-acids, glycerine; of colloids, gelatin, albumens, glue, gums. These are really states, and the power to change from the one to the other seems the very essence of cell life.—Colloids are generally divided into different phases depending on their more liquid or jelly-like condition. Hydrosols are pseudo-solutions, hydrogels are either emulsions or coagulated, or precipitated.—The particles of colloids do not enter into real solutions, but usually exist as suspensions which can be seen with the ultra-microscope. But they are also known to be in suspension and not in solution from the facts that boiling and freezing points of these fluids are not much changed and no osmotic pressure is developed. A few colloids do show these effects and these are soluble.—The foam structure, granular structure, networks, spindle fibres, chromosomes, and the like originate by the more or less solid condition of the multimolecules and large molecular complexes.—Colloidal gels are reversible and non-reversible, gelatin being an example of the former and egg albumen of the latter.—Colloidal particles behave as a single particle in bearing electrical charges, the acid generally being negative and the alkaline positive. Hardy has made an extensive study of the electrical properties of colloids.—The irritability of the human organism is largely due to the state of the colloids in the nervous system, the gel condition causing irritability.—"Only by understanding the reaction of the three substances entering into living combinations, namely, water, crystalloids, and colloids can we hope to comprehend such living processes as metabolism, growth, irritability, and the like; and in order to understand life or the life process the biologist must give his moments to the study of colloids.—*L. Pace.*

1397. Steckbeck, D. Walter. **The comparative histology and irritability of sensitive plants.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 185–230. *Pl. 58–65.* 1919.—The investigator notes that the sensitive plants are most common in tropical countries and that the most widespread irritable response is the nyctitropic, probably induced by rapid changes in temperature, transpiration, and radiation in transition from day to night. Paraheliotropic responses followed with responses to light and mechanical stimuli in sequence. The comparative histology of the sensitive structures is given with emphasis on the various kinds of crystals of calcium oxalate restricted to the endodermis with the membranes surrounding the crystals arranged to form continuous protoplasmic connections throughout the endodermal region as the special conducting lines for the passage of stimuli. It was found that with transition from the less sensitive to the more sensitive species the cells of the pulvini contain, in increasing amount and complexity, aggregation bodies resembling those previously described by Darwin, and others, as associated with irritocontractile centers, and which change under stimulation. All irrito-contractile changes seem to be due to changes first in the protoplasmic sac surrounding each aggregation body, next in the aggregation body itself, finally in the amount of liquid these absorb or give off. The complex hairs of the plant act as delicate receptors of the stimuli.—*John W. Harshberger.*

1398. Tolman, Richard C., and Russell S. Bracewell. **The molecular mechanism of colloidal behavior. II. The swelling of fibrin in alkalies.** Jour. Amer. Chem. Soc. 41: 1503–1510. 1919.—"Tolman and Stearn have studied the swelling of fibrin in acid solutions, and correlated the swelling with the amount of acid absorbed from the solution." They think fibrin covered with water is a fibrous, spongelike structure with many pores full of water. The addition of the acid is followed by the adsorption of hydrogen ions to form a double layer on the surface of these pockets with an increase in size owing to electrostatic repulsion. The addition of a neutral salt or the further addition of acid is followed by a decrease in swelling because of the neutralization of the original electrostatic repulsion. The addition of a neutral salt leads to further adsorption of acid owing to the fact that the neutralization of the electrostatic forces makes it easier for further hydrogen ions to attach themselves to the walls of the pockets. The effect of strong alkalies is similar to the above.—*J. M. Brannon.*

DIFFUSION, PERMEABILITY

1399. Anonymous. **Honey. Newest theories concerning the function of the nectary in flowers.** Sci. Amer. Supplem. 88: 22–23. 1919.—See Bot. Absts. 4, Entry 977.

1400. Bezssonof, N. **Über das Wachstum der Aspergillaceen und anderer Pilze auf stark zuckerhaltigen Nährboden. [Development of Aspergillaceae and other fungi on media containing a high percentage of sugar.]** Ber. Deutsch. Bot. Ges. 36: 646–648. 1918.—*Aspergillus Oryzae*, which was not known to reproduce sexually, produces perithecia when grown on gelatin containing 42 per cent sugar and incubated at 18°C. *Rhizopus nigricans* growing on a 48.7 per cent sugar solution produces zygotes abundantly. Decrease in temperature apparently favors sexual reproduction, which may be the result of the lower oxidation rate at the reduced temperature.—*Ernst Artschwager.*

1401. Citron, H. **Ueber ein neues Verfahren zur Herstellung von Kollodiumsäckchen. [A method of preparing collodion tubes.]** Zeitschr. Immunitätsforsch. 27: 363–364. 1918.—A gelatin capsule of the proper size is coated with collodion on the outside, allowed to dry, the gelatin hydrolyzed by any enzyme preparation or gelatin-liquefying organism and thoroughly washed, after which it is ready for use.—*C. W. Dodge.*

1402. Coupin, Henri. **Sur le pouvoir absorbant du sommet des racines. [Absorption by the tip of the root.]** Compt. Rend. Acad. Sci. Paris 168: 519–522. 1919.—Two seedlings each of pea, Castor bean, bean, and pumpkin, with the plumules scarcely visible and roots of 3 cm. length, were suspended in the same flask in such a way that one of the seedlings did not touch the water in the bottom, while the tip of the root of the other penetrated the water for 2 to 3 mm. The mouth of the flask was plugged with cotton and the cultures placed in the dark at 24°C. At the end of 24 hours the length of root and plumule was recorded and the seedlings so adjusted that only the tips of the roots touched the water. Observations were continued 6 days. In all cases where the tip of the root was immersed in water there was a marked elongation of both plumule and root, and a strong production of lateral roots. Root elongation in the case of pea and bean amounted to 5 to 7 cm., and to 15 cm. in pumpkin. In the seedlings which were merely suspended in the humid air elongation was scarcely perceptible, the plants beginning to dry out at the end of the fourth day. The root is able to absorb water at the very tip in quantities sufficient to permit the maximum development of the seedlings.—*F. B. Wann.*

1403. Crocker, William. **Aeration systems of leaves. [Rev. of: Neger, F. W. Die Wegsamkeit der Laubblätter für Gaze. Flora 11–12: 152–161. 1918 (See Bot. Absts. 2, Entry 619).]** Bot. Gaz. 67: 517–518. 1919.

1404. Crocker, William. **Permeability. [Rev. of: Paine, S. G., and L. M. Saunders. On a peculiarity exhibited by the testa of wrinkled peas. Ann. Botany 32: 175. 1918.]** Bot. Gaz. 67: 279. 1919.

1405. Crocker, William. **Turgor and osmotic pressure. [Rev. of: Thoday, D. On turgescence and the absorption of water by the cells of plants. New Phytol. 17: 108–113. 1918. (See Bot. Absts. 1, Entry 686).]** Bot. Gaz. 68: 72. 1919.—"This article ought to do much to clear up the confusion in this field."

1406. Flood, Margaret G. **Exudation of water by Colocasia antiquorum.** Notes Bot. School Trinity Coll. 3: 59–65. *2 pl.* 1919.—The extreme purity of the water exuded from the leaf tips of *Colocasia antiquorum* appeared to be strong evidence in favor of regarding the water as either raised or exuded by a special gland or as raised osmotically and subsequently purified by glandular action. Observations and experiments indicate, however, that there is no special tissue in the leaf-tip which might be described either as a gland or epithem for the secretion. Neither is there any membrane intervening between the water-channels and the depression in the leaf for filtering the water. It seems that cells lower down must be responsible for the filtration of the water. There seems to be no evidence for the existence of special cells for this function outside of the root.—*G. B. Rigg.*

1407. Haynes, Dorothy. **Electrical conductivity as a measure of electrolytes of vegetable saps.** Biochem. Jour. 13: 111–123. 1919.—A study is made of the influence of non-electro-

lytes on the conductivity of electrolytes in special reference to conductivity measurements of plant juices. The author ascribes the low results obtained in such measurements to the mutual action of non-electrolytes and salts, but does not discuss the nature of the action. A study is also made of the results of Dixon and Atkins on frozen and unfrozen tissues—the author finding there is little evidence for the marked differences which they assume to exist in the proportional composition of the two saps. A formula is suggested by which, in certain cases, conductivity measurements may be reduced to standard conditions.—*A. R. Davis.*

1408. Shull, C. A. **Permeability.** [Rev. of: Free, E. E. **A colloidal hypothesis of protoplasmic permeability.** Plant World 21: 141–150. 1918. Bot. Gaz. 68: 70. 1919.—This new hypothesis as to the nature of permeability and changes in permeability seems to the reviewer less objectionable than any previously proposed; it should stimulate research, since definite testing seems possible.—*H. C. Cowles.*

1409. Ursprung, A. **Über den Einfluss der Erwärmung auf die Wasseraufnahme untergetauchter Sprosse. [On the influence of rise in temperature on the water absorption by submerged plants.]** Ber. Deutsch. Bot. Ges. 36: 514–528. 1918.—Experiments carried on with shoots of *Fagus* and *Thuja* show that an increase in the temperature of the water, in which the shoots are immersed, has at first no effect on water absorption, and often causes a movement in the opposite direction. This is followed by a sudden rise in the absorption curve, then a decrease, and finally a cessation of the movement of water. The decrease, observed by immersing the shoots in water, may be due to the expansion of the air in the vessels. The following rise in the absorption curve is probably due to the activity of the living cells. These cells may at first absorb a small amount of the air in the vessels, thereby producing a negative pressure; however, the amount of air absorbed could only be small and would not account for the sudden rise of the absorptive curve. The explanation may well be sought in the increased absorbing power of the living cells, accompanied by a change in the permeability of the plasma membrane when the temperature of the surrounding medium is increased.—*Ernst Artschwager.*

1410. Ursprung, A., and G. Blum. **Zur Kenntnis der Saugkraft II. [Contribution to our knowledge of the suction force.]** Ber. Deutsch. Bot. Ges. 36: 577–599. 1918.—The method for measuring the suction force of cells is previously described (Ber. Deutsch. Bot. Ges. 34: 525). The material was left in the solution (0.2 M cane sugar) for a definite time, usually one hour. In order to save time in calculating the results, the threshold concentration was determined for two decimals only. Only mature leaves were examined, all of them coming from a single plant, *Hedera*, which was kept under the same environmental conditions throughout the experiment. The following values (expressed in atmospheres) were obtained: lower epidermis 5.6–8.4, upper epidermis 7–8.7, upper palisade 8.7–16.4, spongy parenchyma 7.3–12.4, bundle sheath 7.3–9.3, collenchyma 7.3–8.1, guard cells 7.15–13.7, parenchyma of petiole 6.7–9.3, upper stem 4.2–7.4, lower stem 2.1–3.3, ray cells 2.1–2.6, root 0.8–3.2.—*Ernst Artschwager.*

1411. Ursprung, A., and G. Blum. **Besprechung unserer bisherigen Saugkraftmessungen. [Discussion of earlier results on suction phenomena.]** Ber. Deutsch. Bot. Ges. 36: 599–618. 1918.—The pressure increases from the vascular tissue toward the epidermis. The highest pressure is found in the upper palisade layer. The epidermis gives lower values. The guard cells have a relatively higher pressure than the adjacent epidermal cells. The parenchymatous bundle sheath has a slightly lower value than the epidermis, which would enable the latter tissue to obtain water that could not be obtained through the palisade cells which always have a higher pressure. It becomes apparent that the palisade tissue and the spongy parenchyma obtain the water directly from the water-conducting elements and draw on the supply in the epidermis only when the water content sinks very low. As a rule, the suction force of a tissue increases with its distance from the roots, and in a given cross section of an organ the pressure increases with an increase in the distance from the water-conducting tissue. The one exception is the epidermis of the leaf lamina and this makes it possible that in times of need the palisade cells can draw on the water reservoir of the epidermis.—*Ernst Artschwager.*

WATER RELATIONS

1412. Clark, Arabel W. **Seasonal variation in water content and in transpiration of leaves of Fagus americana, Hamamelis virginiana, and Quercus alba.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 105-143. *33 fig.* 1919.—The object of the research work recorded in this paper was to determine seasonal variations in water content and transpiration of leaves of the beech, witch-hazel, and white oak. Results show that there is no connection between water content and transpiration, temperature and relative humidity, and that from 8 a.m. to 5 p.m., there is practically no variation in water content, but that variations are regular and constant for transpiration. The average water content was greater for *Hamamelis virginiana* than for *Fagus americana* and *Quercus alba.* It was found that water content is highest in the spring, falls during the summer, and rises again in the fall, and that transpiration is greatest in the spring and lowest in the fall.—*John W. Harshberger.*

1413. Coulter, J. M. **Water conduction in trees and shrubs.** [Rev. of: Farmer, J. Bretland. **On the quantitative differences in the water-conductivity of the wood in trees and shrubs.** Proc. Roy. Soc. 90 B: 218-250. 1918. (See Bot. Absts. 2, Entries 305, 306).] Bot. Gaz. 67: 274-275. 1919.

1414. Crocker, William. **Transpiration.** [Rev. of: Duggar, B. M., and W. W. Bonns. **The effect of Bordeaux mixture on the rate of transpiration.** Ann. Missouri Bot. Gard. 5: 153-176. 1918. (See Bot. Absts. 1, Entry 688).] Bot. Gaz. 67: 277-278. 1919.

1415. Crocker, William. **Water movements in plants.** [Rev. of: Renner, O. **Versuche zur Mechanik der Wasservorsorgung.** Ber. Deutsch. Bot. Ges. 36: 172-179. 1918. (See Bot. Absts. 2, Entry 549).] Bot. Gaz. 68: 72. 1919.

1416. Hoagland, D. R., and A. W. Christie. **The effect of several types of irrigation water on the P_H value and freezing point depression of various types of soils.** Univ. California Publ. Agric. Sci. 4: 141-157. 1919.—See Bot. Absts. 4, Entry 1654.

MINERAL NUTRIENTS

1417. Anonymous. **Salt and the growth of coastland plants.** Agric. News [Barbados] 18: 321. 1919.

1418. Bachmann, E. **Wie verhalten sich Holz- und Rindenflechten beim Übergang auf Kalk? [The behavior of wood and tree lichens on a limestone substrate.]** Ber. Deutsch. Bot. Ges. 36: 528-539. 1918.—In the metabolism of endo- and epido-lithic lichens acids are secreted which form soluble salts with the limestone. The secretion of the acid is most pronounced on the surface of the gonida and the tips of the hyphae which penetrate the limestone formation rapidly. The nature of the acid is not known; however, it is very likely that it is carbonic acid which is liberated in the process of respiration of the organism.—*Ernst Artschwager.*

1419. Breazale, J. F. **Response of citrus seedlings in water cultures to salts and organic extracts.** Jour. Agric. Res. 18: 267-274. *Pl. 33-34.* 1919.—Seedlings of various citrus stocks, including lemon, grapefruit, and several varieties of sweet oranges, showed no characteristic differences in response in water cultures or in resistance to toxic solutions.—Very dilute organic extracts from upland peat (10 parts per million or more) stimulated root growth markedly; but sodium nitrate or potassium chlorid, to which the stimulation might have been attributed, proved not to be stimulants.—Calcium carbonate stimulated root growth and also showed pronounced antagonistic action to toxic solutions of nitrates and ammonium sulphate. —Very dilute peat extract (20 parts per million) and calcium carbonate (solid phase present) both protected seedlings against the toxins of distilled water.—Tolerance of seedlings for alkaline salts is relatively high. The toxic limit for calcium hydrate was 100 to 120 parts per million, for sodium hydrate 250 to 300 parts per million, sodium carbonate 550 to 600 parts per

million. Hydroxyl concentration in toxic calcium hydrate solution is only about one-third that of toxic sodium hydrate.—When soluble organic matter, acid in reaction and of itself stimulating in concentrations up to 1000, is added to sodium carbonate solution of 400 parts per million, in itself not toxic, a highly toxic solution is formed which kills the root tips.—*D. Reddick.*

1420. Burd, John S. **Rate of absorption of soil constituents at successive stages of plant growth.** Jour. Agric. Res. 18: 51–72. *Fig. 1–13.* 1919.—A selected strain of Beldi barley was grown one year in silty clay loam and another year in fine sandy loam, contained in boxes. Precautions were taken that individual plants should have access to equal volumes of soil, that loss of soil constituents in drainage should be avoided, and that plant constituents should not be dissolved and removed by rain. Until the tenth week of growth (phase 1) there was a progressively increasing absorption of nitrogen and potassium, when the absolute amounts of these in the plants were as great as at maturity. From this period until heading (phase 2) substantial losses of potassium and nitrogen, and perhaps also of calcium, occurred. During seed ripening (phase 3) absorption from the soil ceased and there were losses of all constituents determined in the plants. Dry matter at harvest was found to be proportional to the fresh weight at the end of phase 1, at which time the absorption of nitrogen and potassium was proportional to growth. Losses from the plants occurred when the amounts of water soluble soil constituents were at or near their minima. The results are interpreted as showing a movement of chemical elements from the plants to the soil, in response to concentration differences between the plant sap and the soil solution. It is concluded that a high concentration of the soil extract is probably unnecessary after the first phase of growth.—*W. E. Tottingham.*

1421. Crocker, William. **Physiological balance in soil and other nutrient solutions.** [Rev. of four papers: Hibbard, R. P. **Physiological balance in the soil solution.** Michigan Agric. Exp. Sta. Tech. Bull. 40. *44 p.* 1917. Livingston, B. E., and W. E. Tottingham. **A new 3-salt nutrient solution for plant cultures.** Amer. Jour. Bot. 5: 337–346. 1918. Shive, J. W., and W. H. Martin. **A comparison of the food requirements of the wheat plant at different stages of its development.** Amer. Jour. Bot. 5: 186–191. 1918. McCall, A. G., and P. E. Richards. **Mineral food requirements of the wheat plant at different stages of its development.** Jour. Amer. Soc. Agron. 10: 127–134. 1917.] Bot. Gaz. 67: 175–177. 1919.

1422. Crocker, William. **Knop's solution.** [Rev. of: (1) Toole, E. H., and W. E. Tottingham. **The influence of certain added solids upon the composition and efficiency of Knop's nutrient solution.** Amer. Jour. Bot. 5: 452–461. 1918. (2) Tottingham, W. E. **Sulfur requirement of red clover plant.** Jour. Biol. Chem. 36: 429–438. 1918.] Bot. Gaz. 67: 448. 1919.—The reviewer wonders how much more the water culture method alone can add to our knowledge of soil fertility, and suggests that in the concentrated nutrient solutions now employed, we may be mainly playing the toxic concentration of one salt against the toxic concentration of another, so as to get the least possible injury. [See Bot. Absts. 2, Entry 1117.]—*H. C. Cowles.*

1423. Green, Newton Baldwin. **The effect of ions of $NaCl$ and $CaCl_2$ upon the electrical conductivity of certain colloidal mixtures.** Plant World 21: 303–316. *7 fig.* 1918.—The behavior of sodium and calcium ions during penetration of several colloids as indicated by measurements of electrical conductivity shows that there is no antagonism between them as regards penetrability; however, calcium moves more slowly than sodium because of its greater adsorption by the colloids. Electrical resistance of colloids containing salts in varying concentrations, varies directly with the precipitability of the colloid, which is greatest at the isoelectric point. Balanced solutions are believed to owe their effectiveness to the fact that protoplasm, by equal adsorption of + and − ions from them, is brought to the isoelectric point, at which point the proteins are most highly ionized, the greatest amount of precipitate is formed, and the greatest (normal) permeability results.—*Charles A. Shull.*

1424. Hoagland, D. R. **Relation of the concentration and reaction of the nutrient medium to the growth and absorption of the plant.** Jour. Agric. Res. 18: 73–117. *Fig. 1–4.* 1919.—This is an attempt to correlate the results of recent methods of investigation in plant nutrition with the present knowledge of soil solutions. Beldi barley was grown in nutrient solutions and in sand irrigated with nutrient solutions. Special care was taken to avoid deficiency of nutrients. Except where the effects of acidity were to be determined, a neutral solution of nutrient salts was used which varied in composition and total concentration. In some cases, the concentration of the nutrient solution was reduced after the tenth week, in imitation of certain seasonal conditions observed with water extracts of soils.—The results indicated the optimal concentration of the nutrient solution to be not over 0.6, and possibly less than 0.1, atmosphere. With the more concentrated solutions, nitrogen and potassium accumulated in the tops of the plants, while it appeared that insoluble phosphates of calcium and magnesium were deposited in the roots. The critical period of absorption of nutrients appeared to fall between the third and tenth weeks of growth. Excessive, and apparently needless, absorption occurred thereafter from the more concentrated solutions. Reduction of the supply of nutrient salts after the tenth week reduced the final yield of straw, but not of seed. It appeared that electrolytes might be returned to the nutrient solution by the plant under conditions of high concentration of the nutrient solution or of low light intensity. The plant sap was found to have a uniform acidity of P_H 6.1. Acid reaction of the nutrient solution (P_H 5.0–5.5) was favorable, and attended by excessive absorption of PO_4 by the plants. The latter absorb the anion faster than the cation from $NaNO_3$, but the excretion of CO_2 regulates the alkalinity of the nutrient solution. Plants transferred from solutions to water lost Ca and PO_4. The author urges consideration of variability in plants in interpreting the yields of culture experiments.—A bibliography of 56 titles is appended.—*W. E. Tottingham.*

1425. Pfeiffer, Th., W. Simmermacher, and A. Rippel (in collaboration with Frl. H. Friske and Frl. Ch. Pfotenhauer). **Der Gehalt der Haferpflanzen an Stickstoff. Phosphorsäure und kali unter berschiedenen Bedingungen und seine Beziehungen zu der durch eine Nährstoffzufuhr bedingten Ertragserhöhung. [The nitrogen, phosphoric acid, and potassium content of the oat plant under different conditions and their relations to the increased yield resulting from addition of nutrients.]** Jour. Landw. 67: 1–57. *6 fig., 15 tables.* 1919.—Investigations are reported having to do with the nutrient content of plants as a measure of the fertilizer needs of the soil. Oat plants were grown in receptacles under different conditions as regards nutrients, water, and light. The results obtained serve as the basis for various calculations in which the formula of Mitscherlich [log $(A-y)=k-c.x$] enters in the construction of yield-curves.—The authors believe that the plant-analysis may in extreme cases serve as a measure of the fertilizer needs of the soil, and that they have established a theoretical groundwork for the existing relation with respect to nitrogen, phosphorus and perhaps potassium.—*C. E. Leighty.*

1426. Willaman, J. J. **Mineral absorption in spinach.** [Rev. of: True, R. H., O. F. Black, and J. W. Kelly. **Ash absorption by spinach from concentrated soil solutions.** Jour. Agric. Res. 16: 15–25. 1919 (See Bot. Absts. 2, Entry 1118).] Bot Gaz. 68: 69–70. 1919.

PHOTOSYNTHESIS

1427. Anonymous. **Nature's factories for sugar and starch.** Sci. Amer. Supplem. 87: 223. 1919.—Photosynthesis discussed in a popular style.—*Chas. H. Otis.*

1428. Boysen-Jensen, P. **Studies on the production of matter in light and shadow plants.** Bot. Tidsskr. 36: 219–259. *Fig. 1–7.* 1918.—In determining the amount of organic material or the increase in dry weight produced per unit time for *Sinapis alba* (light loving plant) and *Oxalis acetosella* (shade loving plant), Boysen-Jensen has measured the photosynthetic intensity. To measure the amount of CO_2 used in photosynthesis and that produced during respiration the absorption method with a few modifications has been employed. To estimate light intensity rhodamin B paper has been used. This, however, does not give other than com-

parative results. However, a light intensity which can darken Bunsen's silver chloride paper to the standard color in 1 second is taken as 100. For *Sinapis* the CO_2 intake is 6 mgm. CO_2 per 50 sq. cm. per hour at 20°C., respiration 0.8 mgm. CO_2 per 50 c. cm. per hour at 20°C. In 4 weeks there was an increase in the dry weight from 0.5 grams to 38 grams for 100 plants.—For *Oxalis* the CO_2 intake is only 0.8 mgm. per 50 sq. cm. per hour at 20°C., while the respiration is 0.1 to 0.2 mgm. CO_2 per 50 c. cm. per hour. The daily per cent increase in dry matter is 2.1 per cent.—*A. L. Bakke.*

1429. Buder, J. **Zur Biologie des Bakteriopurpurins und der Purpurbakterien. [Contribution to the biology of the purple bacteria and their pigment.]** Jahrb. Wiss. Bot. **58**: 525–628. *Pl. 5, fig. 1–5.* 1919.—The paper contains a critical historical consideration of the purple bacteria, the groups of purple organisms, the pigments and their relation to the spectrum, and the connection between absorption and the physiological action of light rays of different wave lengths. The author's own researches were concerned mainly with the effect of light rays of different wave lengths on the movement of the bacteria. The fact that the pigments of the purple bacteria absorb the infra red, the yellow, and the green rays, that is, those regions of the spectrum which are not absorbed by the chlorophyl, enables these organisms to live in water underneath thick layers of vegetation. However, the bacteria grow as well or better in the open water where they may occur at greater depths than when shaded by vegetation. In conclusion, the author discusses the theories of Engelmann and Stahl in relation to the importance of the yellow pigments in assimilation. Although Iwanowski and Willstätter have denied any connection between the presence of these pigments and assimilation, the author seems to think that Stahl's theory still stands. The researches have shown that the selective absorption of the chromatophores of the purple bacteria is an established fact and of the greatest importance to the organisms.—*E. F. Artschwager.*

1430. Crocker, William. **Photosynthesis.** [Rev. of: Osterhout, W. J. V., and A. R. C. Haas. **Dynamical aspects of photosynthesis.** Proc. Nation. Acad. Sci. **4**: 85–91. 1918.] Bot. Gaz. **67**: 182. 1919.

1431. Ewart, Alfred J. **On chlorophyll, carotin and xanthophyll, and on the production of sugar from formaldehyde.** Proc. Roy. Soc. Victoria (N. S.) **30**: 178–209. 1918. [Received 1919.]—Chlorophyll acts as a light-energizing enzyme in the assimilation of CO_2. It takes a direct part in the chemical changes which result in the formation of carotin, xanthophyll, phytyl, and glaucophyllins as intermediate products and of glucose, levulose, formaldehyde and oxygen as end products. There is a continual reconstruction of the chlorophyll molecule during which a large part of the energy represented by the carbohydrate products is absorbed. Carotin, besides being protective, seems to be especially important in providing the massive hydrocarbon combination in the phytyl radicle of chlorophyll which is necessary to convert the dicarboxylic glaucophyllin into the tricarboxylic chlorophyll. Xanthophyll was reduced to carotin by metalic reductases but no oxidase was found which would convert carotin into xanthophyll. A method is described for rapidly polymerizing formaldehyde to sugar; calcium and sodium tartrates were obtained as by-products. Equations are given to show how chlorophyll could act as a photic or lytase enzyme to convert CO_2 and H_2O into carbohydrates.—*E. T. Bartholomew.*

1432. Osterhout, W. J. V. **Apparatus for the study of photosynthesis and respiration.** Bot. Gaz. **68**: 60–62. *1 fig.* July, 1919.—The photosynthesis and respiration of land plants may be studied by placing them in a chamber in which the gas can be made to bubble through an indicator. The changes in the color of the indicator indicate the changes in the tension of CO_2. The method is reported serviceable for classroom demonstration as well as for investigation.—*W. J. V. Osterhout.*

1433. Schroder, H. **Der Chemismus der Kohlensäureassimilation im Lichte neuer Arbeiten. [The chemistry of photosynthesis in the light of new researches.]** Ber. Deutsch. Bot. Ges. **36**: 9–27. 1919.—This paper is an attempt at a critical review of the modern con-

ceptions of photosynthesis, with the purpose of ascertaining whether the theories regarding the chemistry of carbon assimilation have been affirmed, extended, or disproven.—*Ernst Artschwager.*

METABOLISM (GENERAL)

1434. Anonymous. **Production of alcohol from algae.** Sci. Amer. Supplem. 87: 153. 1919. —An experiment with *Laminaria digitata.*—*Chas. H. Otis.*

1435. Anonymous [J. D.]. **Recherches recentes sur la biochimie des hydrates de carbone. [Recent investigations of the biochemistry of the carbohydrates.]** Rev. Gén. Sci. Pures et Appliquées 30: 363–364. 1919.—Condensed summary of many papers, English, French, and American.—*G. J. Peirce.*

1436. Bachmann, Freda M. **Vitamine requirements of certain yeasts.** Jour. Biol. Chem. 39: 235–257. *Pl. 1.* 1919.—Different yeasts vary in their needs for some organic matter other than sugar. Some grow in and ferment a solution containing sugar and inorganic salts only, even when they are introduced in small amounts. One yeast was found that required large amounts of organic matter other than sugar. The substances added to Nägeli's solution in order to enable this yeast to produce fermentation were found to be rich in vitamines, especially water-soluble B. A marked similarity exists between the substances required by this yeast and the vitamines necessary for the development of animals.—*G. B. Rigg.*

1437. Cockerell, T. D. A. **Notes on Coelogyne.** Torreya 19: 227–228. 1919.—This genus of orchids, including over a hundred species, is distributed from India to the New Hebrides. The black markings on the lip of *C. pandurata* Lindl., from Borneo, appear brown by transmitted light, and the pigment gives none of the anthocyanin reactions. It is suggested that these reactions resemble those of curcumin. Anthocyanin seems to be absent in all species of the genus.—*J. C. Nelson.*

1438. Crocker, William. **Catalase, respiration, and vitamines.** [Rev. of two papers: Dutcher, R. Adams. **Vitamine studies. I. Observations on the catalase activity of tissues in avian polyneuritis.** Jour. Biol. Chem. 36: 63–72. 1918. Appleman, C. O. **Respiration and catalase activity in sweet corn.** Amer. Jour. Bot. 5: 207–209. 1918.] Bot. Gaz. 67: 179–180. 1919.

1439. Crocker, William. **Soil acidity.** [Rev. of: Hartwell, B. L., and F. B. Pember. **The presence of aluminum as a reason for the difference in the effect of the so-called acid soil on barley and rye.** Soil Sci. 6: 259–279. *Pl. 1.* 1918 (See Bot. Absts. 2, Entry 1137).] Bot. Gaz. 67: 519. 1919.—See Bot. Absts. 4, Entry 1650.

1440. Crocker, William. **Fucosan vacuoles.** [Rev. of: Kylin, Herald. **Über die Fucosanblasen der Phaeophyceen.** Ber. Deutsch. Bot. Ges. 36: 10–19. 1918 (See Bot. Absts. 2, Entry 573).] Bot. Gaz. 57: 518–519. 1919.

1441. Crocker, William. **Fat storage in evergreen leaves.** [Rev. of: Meyer, Arthur. **Die angebliche Fettspeicherung immergrüner Laubblätter.** Ber. Deutsch. Bot. Ges. 36: 5–10. 1918 (See Bot. Absts. 2, Entry 576).] Bot. Gaz. 67: 520. 1919.

1442. Crocker, William. **Loss of chlorophyll.** [Rev. of: Meyer, Arthur. **Eiweissstoffwechsel und Vergilben der Laubblätter von Tropaeolum majus.** Festschrift zum Ernst Stahl. *P. 85–127.* Jena, 1918.] Bot. Gaz. 67: 446–447. May, 1919.—Meyer has missed the initiating cause of the loss of chlorophyll, because of unsatisfactory cultural experiments and quantitative determinations, also because many of the phases are incompletely worked out, some of the gaps being filled with data drawn from other workers on very different materials. Schertz, in an unpublished paper from the Hull Botanical Laboratory, University of Chicago, finds that in *Coleus Blumei* shortage of nitrogen initiates all of the decomposition of nitrogen

compounds, and that it must be looked at as the immediate cause of the loss of chlorophyll; old leaves can be kept green by the addition of nitrogen fertilizer. It is also conceivable that a great excess of nitrogen may lead to the decomposition of chlorophyll, and that shortage of magnesium may act similarly. [See Bot. Absts. 2, Entry 574.]—*H. C. Cowles.*

1443. Crocker, William. **Distribution of dissolved oxalates in phanerogams.** [Rev. of: Molisch, Hans. **Über den microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche.** Flora 11–12: 60–70. 1918 (See Bot. Absts. 2, Entry 577).] Bot. Gaz. **68**: 72. 1919.

1444. Crozier, W. J. **Intra-cellular acidity in Valonia.** Amer. Jour. Physiol. **49**: 147. 1919.—Three cubic centimeters or more of liquid were extracted from the vacuole of a single cell. In healthy cells the P_H value was 5.9, which was not materially changed even where the external reaction varied from P_H 6.6 to P_H 9.5. In death SO_4 penetrates the cell sap and increases the alkalinity to approximately that of sea water, P_H 8.1.—*Ernest Shaw Reynolds.*

1445. De Vries, O. **Invloed van verandering van tapvlak op latex en rubber.** [**Influence of the change of tapping surface on the latex and rubber.**] Arch. Rubbercult. Nederlandsch-Indië **3**: 130–138. 1919.—See Bot. Absts. 3, Entry 2015.

1446. Dodge, C. W. **Tyrosin in the fungi: Chemistry and methods of studying the tyrosinase reaction.** Ann. Missouri Bot. Gard. **6**: 71–92. 1919.—A chemical study of the action of tyrosinase, obtained from sporophores of *Daedalea confragosa*, *Armillaria mellea*, and *Polyporus sulphureus*, shows that tyrosin is not deaminized in the tyrosinase reaction but that the tyrosin molecule becomes more complex and the carboxyl groups are either split off or masked in the resulting molecule.—*S. M. Zeller.*

1447. Dowell, C. T., and P. Menoul. **The action of furfurol and dextrose on amino-acids and protein hydrolysates.** Jour. Biol. Chem. **40**: 131–136. 1919.

1448. Duggar, B. M. **The micro-colorimeter in the indicator method of hydrogen ion determination.** Ann. Missouri Bot. Gard. **6**: 179–181. 1919.—An adaptation of the Dubosq type of this instrument is described as admirably applicable for the testing of hydrogen ion concentration of pigmented fluids obtainable in small quantities only.—*S. M. Zeller.*

1449. Duggar, B. M., and C. W. Dodge. **The use of the colorimeter in the indicator method of H-ion determination with biological fluids.** Ann. Missouri Bot. Gard. **6**: 61–70. *Fig. 1.* 1919.—For each side of a complete Kober nephelometer-colorimeter there was arranged a pair of cups slipping to a certain depth one into the other. On the left hand side the colorless standard solution is used in the outer cup and the colored test fluid plus indicator in the inner. On the right hand side the colored test fluid is placed in the outer cup and the standard solution plus indicator in the inner. By this method difficulties in determining H-ion concentrations of colored solutions are largely overcome and the useful range of certain brilliant indicators extended so that fewer indicators may be employed.—*S. M. Zeller.*

1450. Falk, G. K. **The carbohydrates of fresh and dehydrated vegetables.** Jour. Indust. Eng. Chem. **11**: 1133. 1919.—The results obtained indicate that no change in the carbohydrate distribution as determined (such as a break down of the more complex to the simpler constituents during dehydration) was observed.—*Henry Schmitz.*

1451. Fennel, E. A., and M. A. Fisher. **Adjustment of reaction of culture mediums.** Jour. Infect. Diseases **25**: 444–451. 1919.—Bacteriologic culture media should be adjusted to a definite hydrogen ion concentration and not by the method of titration to phenolphthalein. The range of growth and that of optimum growth are given, in P_H values, for various pathogenic bacteria.—*Selman A. Waksman.*

1452. Friedrichs, Oscar v. Undersökning över feta koniferoljor. I. Undersökning ab tallfröolja. [Investigations of fatty conifer oils. I. Investigations of pine seed oil—Pinus silvestris L.] Svensk Farm. Tidskr. 23: 115–151, 461–463. 1919.—See Bot. Absts. 4, Entry 425.

1453. Friedrichs, Oscar v. Undersökningar över feta koniferoljor. II. Undersökning av granfröolja. [Investigations of fatty conifer oils. II. Investigation of spruce-seed oil—Picea abies Karsten.] Svensk Farm. Tidskr. 23: 500–505. 1919.—See Bot. Absts. 4, Entry 426.

1454. Griebel, C., and A. Schäfer. Zur Zusammensetzung der Inklusen, gleichzeitig ein Beitrag zur Kenntnis der Vorgänge beim Teigigwerden der Früchte. [The composition of "Inclusions" and the process of mellowing of fruits.] Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 97–111. 1919.—"Inclusions" are tannin-containing intracellular bodies. The mesocarp of a number of fruits, chiefly varieties of pear, consists entirely of inclusions. With one known exception, they mellow rapidly. The disappearance of acid taste is not due to loss of tannin but to its becoming insoluble as a result of a kind of coagulation of the inclusions. The inclusions of domestic pears contain a tannin soluble in water and in alcohol, bound in part to a sparingly soluble colloid substance of unknown composition which forms the body of the inclusion. With the mellowing process are gradually formed brown colored products (Phlobasphen). Similar processes take place in other fruits which are rich in inclusions.—In the mellowing of pears acetaldehyde is formed. The pentosan and galactan content of the inclusions is very small, probably arising from the cell wall. Sugars have never been obtained by hydrolysis.—The reaction of the tannin from these inclusions with $FeCl_3$ and NaOH indicates the presence of a pyrocatechin derivative. A small amount of protocatechuic acid is present, but no phloroglucin. The tannin in question belongs to the oak bark group and does not possess a glucosidal character.—The violet color reaction of the inclusions with KOH has to do with the combination of tannin with the colloid body.—Inclusions have recently been found in the following varieties of fruits in nearly all cells of the mesocarp: *Pirus communis* L., *P. salicifolia* L., *fil.*, *P. betulifolia* Bge., *P. amygdaliformis* Vill., *P. sinensis* Lindb., *P. pulcherrima* A. et G., *P. baccata* L. and *Prunus spinosa* L.—*H. G. Barbour.*

1455. Hepburn, Joseph Samuel. The work of previous investigations on Nepenthes. Contrib. Bot. Lab. Univ. Pennsylvania 4: 419–442. 1919.—This is the first part of a series of four papers, which appear in the second part of the fourth volume of Contributions from the Botanical Laboratory of the University of Pennsylvania, on the pitcher liquors found in different species of *Nepenthes* and *Sarracenia*. As the title indicates, it is an account of previous work done on the liquors from Nepenthes pitchers and comprises reference to the chemical investigations and experiments of Voelcker, Hooker, Von Gorup and Will, Vines, Dubois, Couvreur, Tischutkin, Goebel, Clautriau, Fenner, Abderhalden and Teruuchi, Robinson, Jenny Hempel, Shibata and Nagai, and Pfeffer. It is an introduction to the papers which follow as the original contribution to the subject.—*John W. Harshberger.*

1456. Hepburn, Joseph S., and E. Quintard St. John. A bacteriological study of the pitcher liquors of Nepenthes. Contrib. Bot. Lab. Univ. Pennsylvania 4: 451–459. 1919.—This is the third paper in the series of studies of the pitcher liquor of Nepenthes. The investigation was started to prove or disprove the statement of some that the digestive action of the pitcher liquor of *Nepenthes* was due to the activity of micro-organisms. It was found that the liquor taken aseptically from unopened pitchers was sterile, while the liquor in partly opened pitchers free from insects contained a goodly number of bacteria. Liquor from open active pitchers, containing insect remains, had a bacterial count of from 48,000 to 8,000,000 per cubic centimeter. These organisms were rods and they were grown in pure culture to test their action on various media with the following conclusions. The slowness with which bacterial digestion of protein occurred shows that bacteria play but a secondary rôle in the digestion of insects in the pitcher. The leading rôle in the digestion is played by the protease of the pitcher liquor.—*John W. Harshberger.*

1457. Ikeguchi, T. **A new sterol.** Jour. Biol. Chem. **40**: 175–182. 1919.—A new sterol has been isolated from *Hydnum aspartum*, *Lycoperdon gemmatum*, and other species of fungi. It is regarded as probably occurring throughout all species of fungi, hence is named mycosterol.—*G. B. Rigg.*

1458. Lewis, H. B. **The antiscorbutic value of the banana.** Jour. Biol. Chem. **40**: 91–101. 1919.—Experiments suggest that a lower content of the antiscorbutic principle (bananas were used) may be sufficient to protect against scurvy if the diet is adequate in its content of the other essential dietary constituents. Guinea-pigs died when fed on bananas only.—*G. B. Rigg.*

1459. McClendon, J. F., and Wyman C. C. Cole. **The antiscorbutic properties of green malt.** Amer. Jour. Physiol. 49: 145–146. 1919.—"Malt had little antiscorbutic power before the acrospire projected beyond the grain, but had marked antiscorbutic power when the acrospire projected to a distance equal to the length of the grain."—*Author's summary.*

1460. McClendon, J. F., W. C. C. Cole, O. Engstrand, and J. E. Middlekauff. **The effects of malt and malt extracts on scurvy and the alkaline reserve of the blood.** Jour. Biol. Chem. **40**: 243–258. *Fig. 1–8.* 1919.—Sprouted cereal grains are rich in antiscorbutic substance. The substance is not destroyed by heating to 70° to gelatinize the starch. It may be extracted from sprouted barley which has been crushed fine enough to rupture the cells of the acrospire.—*G. B. Rigg.*

1461. Mellanby, John. **The composition of starch. Part I. Precipitation by colloidal iron. Part II. Precipitation by iodine and electrolytes.** Biochem. Jour. **13**: 28–36. 1919.—The author separates starch into three fractions by means of precipitation with colloidal iron. These three fractions, "a," "b," and "c," form respectively, 8, 9, and 11 per cent of the starch granulose, "a" being precipitated by colloidal iron only, "b" by colloidal iron and electrolytes, and "c" not precipitated by colloidal iron under any conditions.—Precipitation by iodine and electrolytes shows (1), that starch contains an insoluble constituent not reacting with iodine (amylo-cellulose), (2) that all soluble constituents of starch are precipitated by iodine in the presence of electrolytes, and (3) that the final fraction precipitated by iodine gives the brown color.—Results tend to show that starch contains a variety of polymers varying in complexity from amylodextrin to amylocellulose, the bulk of the granule being made up of amylogranulose.—*A. R. Davis.*

1462. Molliard, Marin. **L'ovalbumine constitue un aliment complet pour l'Isaria densa. [Utilization of egg albumen by Isaria densa.]** Compt. Rend. Acad. Sci. Paris **168**: 523–524. 1919.—*Isaria densa* is capable of satisfying all its nutritive requirements on egg albumen. The commercial powder was dissolved in water and coagulated slowly, a mass of fine flakes resulting. This material, after being washed several times, served directly as the medium. Digestion of the albumen is more rapid when it is used alone than when sugar is added. The rate of oxidation was compared on three media: (1) albumen alone; (2) albumen plus Raulin's solution, and (3) the latter plus 2 per cent sucrose. Cultures were grown in sealed flasks provided with manometers. The respiratory quotient on albumen alone was 0.55; on medium no. 2 it was 0.63, and on no. 3 it was 0.82.—Oxalic acid is formed abundantly in the cultures. The rapid oxidation of the albumen is to be interpreted in the light of the small respiratory quotient and the formation of oxalic acid.—*F. B. Wann.*

1463. Nakayama, Y. **Observations on streptolysin.** Jour. Infect. Diseases **25**: 509–510. 1919.—Streptococci produce hemolysin successfully in plain broth with equal or larger quantities of serum. The hemolysin is filterable, although it loses somewhat in strength on filtration. With the increase of the virulence of streptococci, on successive animal passage, the production of hemolysin is increased, particularly in its action upon the corpuscles of the specific animal through which it has been passed.—*Selman A. Waksman.*

1464. Osborne, T. B., and A. J. Wakeman. **Extraction and concentration of the water-soluble vitamine from brewers' yeast.** Jour. Biol. Chem. 40: 383-391. 1919.—An extract was obtained containing less than one-fifth of the yeast solids and nearly all of the water-soluble vitamine.—*G. B. Rigg.*

1465. Palmer, L. S., and H. L. Kempster. **Relation of plant carotinoids to growth, fecundity and reproduction of fowls.** Jour. Biol. Chem. 39: 299-312. *Pl. 1.* 1919.—The yellow pigment of the yolk of hen's eggs is chemically identical with one of the xanthophyll group of plant carotinoids. The amount of xanthophyll in egg yolk, blood serum and body fat of a fowl is dependent upon the amount of xanthophyll in the food eaten. The natural yellow pigment of fowls which is derived from the xanthophyll of the food bears no important relation to growth or to the functions of fecundity and reproduction, at least for one generation.—*G. B. Rigg.*

1466. Palmer, L. S., and H. L. Kempster. **The physiological relation between fecundity and the natural yellow pigmentation of certain breeds of fowls.** Jour. Biol. Chem. 39: 313-330. *2 pl.* 1919.—The yellow pigment in shanks, ear lobes, and beaks of certain fowls such as leghorns and others is due to the presence of xanthophyll in the food. These parts lose their yellow color when the fowl is fed on food that is free from xanthophyll. The yellow pigment fades from these parts during fecundity because of the deflection of the normal path of the excretion of the xanthophyll from these parts of the skin to the egg yolk. The pigment in the parts of the skin mentioned is largely in granular form.—*G. B. Rigg.*

1467. Palmer, L. S., and H. L. Kempster. **The influence of specific feeds and certain pigments on the color of the egg yolk and body fat of fowls.** Jour. Biol. Chem. 39: 331-337. 1919.—Xanthophyll, fed in the form of yellow corn, has an immediate effect on the adipose tissue and visible skin parts of fowls of the type of white leghorns. Carotin and the orange-yellow pigment of annatto seed are without influence on the color of the adipose tissue of poultry. Yellow corn and green feed are rich in xanthophyll. A little of this pigment is found in hemp seed, barley, gluten feed, and red corn. Wheat, oats, cotton-seed meal, and rape seed contain negligible quantities of xanthophyll.—*G. B. Rigg.*

1468. Patschovsky, Norbert. **Über Nachweis, Lokalisierung und Verbreitung der Oxalsäure (gelösten Oxalate) im Pflanzenorganismus. [Occurrence, localization and distribution of oxalic acid (dissolved oxalates) in the plant.]** Ber. Deutsch. Bot. Ges. 36: 542-548. 1918.—Calcium salts, such as the nitrates or chlorides which are used to determine the presence of dissolved oxalic acid in the plant cell, have the disadvantage that, in the precipitation of the calcium oxalate, tannins are also precipitated and hide the calcium salt. In ferrous sulphate, acidified with acetic acid, a reagent is found which precipitates the oxalic acid as lemon yellow ferro crystals, and at the same time imparts a blue or greenish color to the tannin. The reagent can be applied to microscopic sections directly or is allowed to be absorbed by the plant before sectioning. In the latter case it is necessary to use a relatively high concentration of the iron salt if the crystals are to be formed inside the cells. By using ferrous sulphate as a reagent, the occurrence and distribution of calcium oxalate and tannin was studied in a large number of plants.—*Ernst Artschwager.*

1469. Pringsheim, Hans, and Hans Magnus. **Über den Acetylgehalt des Lignins. [Acetyl content of lignin.]** Zeitschr. Physiol. Chem. 105: 179-186. 1919.—When wood or straw is treated with sodium hydrate in the cold all the acetic acid liberated is derived from the lignins of these materials. When these materials are boiled with sodium hydrate either under pressure or otherwise most of the acetic acid formed is derived from the lignins, but a small part is derived from the cellulose, and none from the pentoses. The lignin of the white beech yields about 37.85 per cent of its weight of acetic acid and the lignin of conifer wood about 19.48 per cent.—*William Crocker.*

1470. Ruediger, E. H. **Exclusion of air in the cultivation of the Gonococcus.** Jour. Infect. Diseases 24: 376-378. 1919.—The following medium is recommended for the isolation

and cultivation of Gonococcus: veal broth, neutral to phenolphthalein, agar, salt, peptone and 10 per cent human blood which had been heated to 56°C. for 30 minutes; the culture tubes were stoppered air-tight. Salt could be omitted; the addition of glycerol or dextrose or the omission of peptone seemed to be unfavorable.—*Selman A. Waksman.*

1471. Rupp, E., and F. Lehmann. **Zur Titration von Zuckerarten. [Titration of sugars.]** Zeitschr. Untersuch. Nahrungs-u. Genussmittel 37: 162–164. 1919.

1472. Scales, F. M. **The cuprous chloride-iodine method for reducing sugars simplified.** Jour. Indust. Eng. Chem. 11: 747–750. 1919.—A method applicable for any reducing sugar is described for the determination of reduced copper by iodimetry in a modified Benedict's solution.—*Henry Schmitz.*

1473. Sperlich, Adolf. **Jod, ein brauchbares mikrochemisches Reagens für Gerbstoffe, insbesondere zur Darstellung des Zusammenhanges in der Verteilung von Gerbstoff und Starke in pflanzlichen Geweben. [Iodine, a useful micro-chemical reagent for tannins, especially for proving the relation in the distribution of tannin and starch in plant tissues.]** Sitzungsber. K. Akad. Wiss. Wien. (Math.-Nat. Kl.) 126: 103–153. *1 pl.* 1917.—Free idoine, in traces, can penetrate the living plasma of the plant cell without harming it, and causes the tannins in solution in the cell sap to form firm and characteristic bodies of brownish color. These are apparently oxidation products belonging near or in the phlobaphene group. The greatest advantage in the use of this reagent lies in the simultaneous and definitely contrasted presentation of the starch and tannin under the microscope. Investigations with members of various groups of the flowering plants showed that in plants where both starch and tannins are present, they are not as a rule present in the same cell, and often the secretion and disorganization of the two substances run parallel. In tissues or tissue zones homogeneous as to content, one of the substances makes way for the other in the course of development. The opinion that all tannins are insignificant excretions, or perhaps protective excretions, should be discarded.—*V. C. Dunlap.*

1474. Steenbock, H. **White corn vs. yellow corn, and a probable relation between the fat-soluble vitamine and yellow plant pigments.** Science 50: 352–353. 1919.—Two years ago the writer experienced some difficulty in getting rats to rear their young on a ration which, to a considerable extent, consisted of corn. During the course of the past year a considerable amount of work dealing with the occurrence of the fat-soluble vitamine in roots was completed. It was indicated that colored roots such as carrots and sweet potatoes are rich in fat-soluble vitamines, while sugar beets, mangels, dasheens, and Irish potatoes contain little or none of it. It was then recalled that when the difficulty with female rats to rear their young had been observed it had been impossible to obtain sound yellow corn, and white corn had been used. It has now been demonstrated with eight different varieties of corn grown in the middle west, that while white corn contains no demonstrable amounts of fat-soluble vitamine, yellow corn may contain sufficient amounts to allow normal growth and reproduction in the rat. These relations suggested the possibility of correlating other instances of the simultaneous occurrence of fat-soluble vitamine and yellow plant pigments, such as oleo oils and butter fat. From evidence it appears reasonably safe, at least as a working hypothesis, to assume that the fat-soluble vitamine is a yellow plant pigment, or a closely related compound.—*A. H. Chivers.*

1475. Steenbock, H., and E. G. Gross. **Fat-soluble vitamine. II. The fat-soluble vitamine content of roots, together with some observations on their water-soluble vitamine content.** Jour. Biol. Chem. 40: 501–531. *Pl. 1.* 1919.—The fat-soluble content is high in carrots and yellow sweet potatoes as compared with red beets, parsnips, rutabagas, sugar beets, potatoes, mangels, and dasheens. Absolute comparisons of the amounts of the vitamine found in different plant materials are impossible until we know something of its association with specific principles or physiological processes in plants.—*G. B. Rigg.*

1476. Sugiura, K., and S. R. Benedict. The nutritive value of the banana. Jour. Biol. Chem. 40: 449-468. 1919.—The experiments performed suggest that bananas and milk in proper proportion constitute a complete food for albino rats.—*G. B. Rigg.*

1477. Ten Houte De Lange, W. G., Jr. Rubberproductie-Krommen. [Rubber production curves.] Arch. Rubbercult. Nederlandsch-Indië 2: 105-111. 1918.—See Bot. Absts. 3, Entry 2060.

1478. Truog, Emil, and M. R. Meacham. Soil acidity: II. Its relation to the acidity of the plant juices. Soil Sci. 7: 469-474. 1919.—See Bot. Absts. 4, Entry 1659.

1479. Wager, Harold. A fluorescent colouring matter from Leptonia incana Gill. Trans. British Mycol. Soc. 6: 158-164. 1919.—See Bot. Absts. 4, Entry 1178.

1480. Weinhagen, Albert B. Beiträge zur Muscarin-Frage. I Mitteil. Zur Kenntnis der Platindoppelsalz einiger Basen. [The muscarine problem; the platinum double salts of certain bases.] Zeitschr. Physiol. Chem. 105: 249-257. 1919.

1481. White, H. L. The modification of the composition of vegetable oils, with special reference to increasing unsaturation. Jour. Indust. Eng. Chem. 11:648-651. 1919.—The processes of germination and growth of soy beans up to a height of 8 to 12 cm., even under favorable conditions of growth, do not result in an increase of unsaturated acids in the ether extract from such plants. The effect of heat, light, enzymes, and salts of some metals on the degree of unsaturation of vegetable oils is also dealt with.—*Henry Schmitz.*

1482. Willaman, J. J., R. M. West, D. O. Spriestersbach, and G. E. Holm. Notes on the composition of the sorghum plant. Jour. Agric. Res. 18: 1-33. 1919.—Three varieties of sorghum cane were used. A continual increase in dry matter up to maturity was found; also a decrease in crude fiber at the same rate that soluble carbohydrates increase. The percentages of fat, ash, and protein remain constant throughout the period of growth studied.—The data indicate that the plant builds up in the earlier part of the season its cellular structure of fiber, protein, and mineral matter, and that these tissues are filled with carbohydrates in the later stages of growth.—There is no evidence that the leaves are deprived of carbohydrates to supply the stalk. In the juice, galactan, pentosans, and mineral matter (largely calcium, potassium, and magnesium) occur. Such organic acids as aconitic, malic, citric, tartaric, and oxalic were found in the juice. Amid nitrogen was also high in the sorghum juice, other juice constituents were l-leucin, d-l-asparagin, glutamin, cystin, and aspartic acid.—"The middle joints of the cane are higher in total sugars but lower in dextrose and in levulose than the upper and lower joints." The sorghums grown in the northern regions are lower in sugars than in the southern, warmer regions.—*J. M. Brannon.*

1483. Winterstein, E. Über das Vicin. I Mitteil. [Vicin.] Zeitschr. Physiol. Chem. 105: 258-264. 1919.

1484. Zeller, S. M., and Henry Schmitz. Studies in the physiology of the fungi. VIII. Mixed Cultures. Ann. Missouri Bot. Gard. 6: 183-192. *Pl. 4.* 1919.—Mixed cultures of several Basidiomycetes and Hyphomycetes were grown upon potato agar plates and observations made upon their ability to inhibit or stimulate the growth of one another. The fungi were also grown separately on a nutrient solution containing the same ingredients as the agar. Some of the observations lead to the following conclusions: (1) There is no definite relation between the active acidity produced by the fungi and the inhibition and stimulation of growth. (2) In some cases, at least, inhibition of growth is due to depletion of carbohydrate. (3) The tendency of growth away from "staled" media is more probable than growth toward diffusion centers.—*S. M. Zeller.*

1485. Zerban, F. W. The color changes of sugar cane and the nature of cane tannin. Jour. Indust. Eng. Chem. 11: 1034-1036. 1919.—The polyphenol of the sugar cane giving a

green color with ferric salts is not pyrocatechin. It is a true tannin, giving a precipitate with gelatin, and is, like the oak tannins, derived from pyrocatechin, not from pyrogallol. Heat alone produces pyrocatechin, and no pyrogallol; dilute acids give rise to a phlobaphene and protocatechuic acid, but no ellagic or gallic acids; potash fusion yields protocatechuic acid and acetic acids, but no gallic acid or phloroglucin.—*Henry Schmitz.*

METABOLISM (NITROGEN RELATIONS)

1486. Allen, E. R., and B. S. Davisson. **An all-glass nitrogen apparatus.** Ann. Missouri Bot. Gard. **6**: 45-48. *Pl. 2.* 1919.—An all-glass nitrogen apparatus was devised for use in nitrogen determinations in connection with the study of the metabolism of soil bacteria and general plant metabolism. Special features of the described apparatus are the absence of rubber connections, the efficient scrubbing of the entrained alkali from the steam, and the use of Pyrex glass which does not yield an appreciable amount of alkali to steam or boiling solutions.—*S. M. Zeller.*

1487. Allen, E. R., and B. S. Davisson. **On the relative accuracy of colorimetric and titrimetric procedures for determining nitrogen as ammonia.** Jour. Biol. Chem. **40**: 183-197. 1919.—Colorimetric procedures in the determination of nitrogen are of service because of their brevity, but except when dealing with minute amounts of nitrogen, titrimetric methods should be chosen where exact results are required.—*G. B. Rigg.*

1488. Bottomley, W. B. **Nucleic derivatives from peat.** Jour. Amer. Peat Soc. **12**: 226. 1919.—British patent 124329 covers the preparation of nucleic acid and nucleates from peat by means of alkaline solutions.—*G. B. Rigg.*

1489. Bracewell, Russell S. **The molecular mechanism of colloidal behavior. III. The chemical nature of the adsorption of acids and alkalies by the protein molecule.** Jour. Amer. Chem. Soc. **41**: 1511-1515. 1919.—The author's work showed that with strong acids and alkalies there is a fairly definite maximum number of equivalents of acid or base adsorbed by fibrin, but the adsorption is not increased greatly by increasing the concentration of the supernatant solution. This supports the idea that adsorption depends on chemical factors.—*J. M. Brannon.*

1490. Conn, H. J., and J. W. Bright. **Ammonification of manure in soil.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 67. *45 p.* 1919.—See Bot. Absts. 3, Entry 850; 4, Entry 1643.

1491. Crocker, William. **Reaction of the medium and nitrogen assimilating organisms.** [Rev. of: Fred, E. B., and Audrey Davenport. **Influence of reaction on nitrogen-assimilating bacteria.** Jour. Agric. Res. **14**: 317-336. 1918 (See Bot. Absts. 2, Entry 169).] Bot. Gaz. **67**: 277. 1919.—The reviewer regrets that the reaction was not determined by the gas chain as well as by the colorimetric method.—*H. C. Cowles.*

1492. Crocker, William. **Nitrogen fixation by Azotobacter.** [Rev. of: Hutchinson, H. B. **The influence of plant residues on nitrogen fixation and on losses of nitrate in the soil.** Jour. Agric. Sci. **9**: 92-111. 1918 (See Bot. Absts. 2, Entry 583).] Bot. Gaz. **67**: 518. 1919.

1493. Edlbacker, S. **Notiz über eine Farbreaktion der Eiweisskörper.** [**A color test for albumen.**] Zeitschr. Physiol. Chem. **105**: 240-241. 1919.—This new test is very similar to the glyoxylic reaction and seems to be conditioned by the presence of tryptophan.—*William Crocker.*

1494. Grünhut, L. **Die Bestimmung des Aminosäuren-Stickstoffs, insbesondere in Suppenwürzen und Ersatzbrühwürfeln.** [**Determination of amino-acid nitrogen.**] Zeitschr. Untersuch. Nahrungs- u. Genussmittel **37**: 204-324. 1919.

1495. Hiller, Alma, and D. D. Van Slyke. **Direct determination of non-amino nitrogen in the products of protein hydrolysis.** Jour. Biol. Chem. 39: 479–488. 1919.

1496. Jones, D. B., and C. O. Johns. **The hydrolysis of stizolobin, the globulin of the Chinese velvet bean, Stizolobium niveum.** Jour. Biol. Chem. 40: 435–448. 1919.—The globulin was hydrolyzed and the resulting amino-acids determined. Glutaminic acid, aspartic acid, leucine, and lysine are the most abundant ones.—*G. B. Rigg.*

1497. Koessler, K. K., and M. T. Hanke. **Studies on proteinogenous amines. II. A microchemical colorimetric method for estimating imidezole derivatives.** Jour. Biol. Chem. 39: 497–519. 1919.

1498. Koessler, K. K., and M. T. Hanke. **Studies on proteinogenous amines. IV. The production of histamine from histidine by Bacillus coli communis.** Jour. Biol. Chem. 39: 539–584. 1919.

1499. Meyer, Arth. **Die Beziehung zwischen Eiweiss- und Säurebildung in Laubblättern. [Relation between synthesis of proteins and formation of acid in leaves.]** Ber. Deutsch. Bot. Ges. 36: 508–514. 1919.—1. In the presence of carbohydrates, small amounts of protein are synthesized in the dark; but much larger amounts in the light. The presence or absence of CO_2 does not influence this process. Leaves devoid of chlorophyll do not synthesize protein in either case. 2. The acidity of the leaf decreases slightly in the dark, very rapidly in the light, and hardly at all in leaves devoid of chlorophyll; the presence or absence of CO_2 has no influence. 3. Shaded leaves show only a small amount of calcium oxalate; increase in light intensity increases the calcium oxalate content. This process is independent of the CO_2 content of the atmosphere. Protein synthesis, decrease in acidity, and the appearance of calcium oxalate in the leaves are closely correlated. The green leaves which synthesize a large amount of protein in the light obtain the ions for the building up of the protein molecule from the carbohydrates and the inorganic salts. The bases of these salts are set free and are neutralized by organic acids produced in the leaves. The organic acids are usually formed in quantities sufficient to neutralize the free bases. Sometime, however, an excess of the acid is produced, due to a prolonged effect of the stimulation of the acid on the protoplast. The oxygen set free in protein synthesis is either used in synthesis of organic acids from carbohydrates or is liberated as free O_2.—*Ernst Artschwager.*

1500. Peters, A. W. **The micro determination of nitrogen by direct Nesslerization and of total solids in drop quantities of human blood.** Jour. Biol. Chem. 39: 285–298. 1919.—A method is described for the determination of total solids and of total and non-protein nitrogen in fifteen to thirty drop quantities of human blood.—*G. B. Rigg.*

1501. Willaman, J. J. **Nitrogen fixation.** [Rev. of: Allen, E. R. **Some conditions affecting the growth and activities of Azotobacter chroococcum.** Ann. Missouri Bot. Gard. 6: 1–44. 1919 (See Bot. Absts. 4, Entry 1532).] Bot. Gaz. 68: 71–72. 1919.

METABOLISM (ENZYMES, FERMENTATION)

1502. Anonymous. [Rev. of: Coff, John R., W. V. Linder, and G. F. Beyer. **Production of glycerine from sugar by fermentation.** Jour. Indust. Eng. Chem. 11: 842–845. 1919.] Jour. Franklin Inst. 188: 575. 1919.—A molasses solution made alkaline and held at about 30° to 32°C. gave with the Steinberg variety of *Saccharomyces ellipsoideus* a yield of glycerine equal to 20 to 25 per cent of the sugar. Corn sugar and cane sugar gave poorer yields.—*Ernest Shaw Reynolds.*

1503. Anonymous. **Alcoholic fermentation of banana-must.** Sci. Amer. Supplem. 87: 233. 1919.

1504. Bodansky, M. **A note on the determination of catalase in blood.** Jour. Biol. Chem. 40: 127–130. 1919.—There seems to be no satisfactory absolute method for the determination of catalase. Temperature and P_H values are important factors, and there is no well defined PH value for maximum action.—*G. B. Rigg.*

1505. Edie, Edward Stafford. **The effect of alcohol on the digestion of fibrin and caseinogen by trypsin.** Biochem. Jour. 13: 219–225. 1919.—The action of trypsin on fibrin is inhibited when alcohol is present to the extent of 3 per cent while the digestion of caseinogen by the same enzyme is not effected until the alcohol concentration reaches 10 per cent. The author concludes the harmful action is not due to the destruction of trypsin by alcohol since dilute alcohol seems to aid digestion. The suggestion is made that if trypsin is a single enzyme, the digestion of fibrin and caseinogen is probably carried out by side chains, those digesting fibrins being more readily effected by alcohol than others.—*A. R. Davis.*

1506. Euler, Hans V., and Ragnar Blix. **Verstärkung der Katalasewirkung in Hefezellen. [Accelerating catalase action in yeast cells.]** Zeitschr. Physiol. Chem. **105**: 83–114. 1919.—The authors have determined the effect of various conditions and reagents upon the catalase activity of yeast cells. Where possible they used the potassium permanganate titration method for determining catalase activity. In cases where additions of thymol, glucose, etc., rendered the permanganate method inaccurate, the volumetric method was used. They used mainly their cultures of distillery top yeast S. B. II. Some experiments were run with brewery bottom yeast. They agree with Phragmen's findings that yeast splits dilute solutions of hydrogen peroxide without secreting a soluble enzyme into the bathing fluid. The reaction is one of the first order. The reaction constant increases in proportion to the amount of yeast. Small amounts of protosplasmic poisons (toluol or chloroform) raise the catalase activity of these cells six-fold. When cells were dried in the air or otherwise without injuring them the catalase activity rose ten to fifteen fold. When emulsions of the yeast were heated $\frac{1}{2}$ to 2 hours at 55° to 63°C. the catalase activity rose twenty to thirty fold. The activation by heating is greatly influenced by reagents in the emulsion at the time of heating. Similar activation of catalase has been demonstrated in a number of other microörganisms. The catalase activity of yeast can be raised by previous treatment with sugar solutions. This increased catalase activity is not due to increased permeability of the cells to catalase, but is an activation within the living cells. The reaction constant is not a measure for the catalase content of the cells.—*William Crocker.*

1507. Euler, H., and O. Svanberg. **Enzymatische Studien über Zuckerspaltungen. [Enzymatic studies on sugar fermentation.]** Zeitschr. Physiol. Chem. **105**: 187–239. 1919.—Euler and Svanberg made a study of alcoholic fermentation in an alkaline medium in which $P_H = 8$. Top yeast and *Torula* gave about equal weights of carbon dioxide and alcohol, each equal to 30 to 33 per cent of the weight of the sugar fermented. Glucose, fructose, and invert sugar were fermented with about equal speed, mannose about 30 per cent as fast, and galactose very slowly. Invertase is active in this medium and maltase inactive. The following are the maximum alkalinities in which cell division occurs in the various yeasts. Frohberg Unterhefe H, $P_H = 7.7$–8.0; Brennerei-Oberhefe S. B. II, $P_H = 7.3$–8.4; *Saccharomyces ellipsoideus*, $P_H = 7.9$; *Pseudosaccharomyces apiculatus*, $P_H = 7.6$. Increase in weight occurred in S. B. II up to $P_H = 8.5$. For Frohberg Unterhefe H the full curve of acid sensitivity was worked out and the optimum was found to be at $P_H = 5$.—*William Crocker.*

1508. Fisher, Ernest Arthur. **Contributions to the study of the vegetable proteases. I. Introductory.** Biochem. Jour. 13: 124–134. 1919.—This investigation has to do with the determination of proteoclastic enzymes in leaves and other parts of certain farm crops as well as a study of their resemblance, if any, to seed proteases. Fourteen crops were studied, including barley, oats, maize, rye, red clover, white clover, lucerne, vetch, field beans, peas, buckwheat, white mustard. The Sörenson method of determining proteolysis by formation of free carboxyl groups was employed and a detailed description of technique is given. The author finds that all plants examined showed a protease capable of splitting Witte's peptone

into simple amino-acids. This activity varies with the nature of the plant, but is individual rather than generic.—Legumes did not, on the whole, show greater activity than non-legumes, although the activity of foliage of young field peas was about 2½ times that of young oats. White mustard, especially in the flowering stage, was more active than the other plants, except peas. In general, activity was greater at the flowering stage, than earlier.—Both protease and peptase activity of the leaves increase with maturity to the time of harvesting, and does not fall off when translocation of foodstuffs takes place and during dying of leaves.—*A. R. Davis.*

1509. Fred, E. B., W. H. Peterson, and A. Davenport. **Acid fermentation of xylose.** Jour. Biol. Chem. 29: 347–381. *Pl. 1.* 1919.—Xylose is readily fermented by bacteria which are found in fresh silage, sauerkraut, manure, and certain soils. These xylose fermenters are easily isolated in pure culture. The fermentation of xylose takes place either in the presence of free oxygen or in a limited supply. The main products formed in the fermentation of xylose are acetic acid and lactic acid. The fermentation is rapid, practically all of the xylose disappearing within 10 or 12 days after inoculation.—*G. B. Rigg.*

1510. Gurjar, A. M. **Enzyme action.** [Rev. of: Van Laer, Henri. **Actions entre enzymes.** Zeitschr. Gärungsphysiol. 6: 169–175. 1918 (See Bot. Absts. 3, Entry 2882).] Bot. Gaz. 67: 515. 1919.

1511. Hepburn, Joseph Samuel. **A study of the protease of the pitcher liquor of Nepenthes.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 442–450. 1919.—The formol titration showed that the liquor from stimulated pitchers produced proteolysis of ovalbumen, fibrin, ovomucoid, Nährstoff-Heyden, and Witte peptone, while the liquor from non-stimulated pitchers lacked proteolytic power. This method also showed that, in the presence of very dilute hydrochloric acid, edestan was digested by the liquor from stimulated pitchers, but not by that from non-stimulated pitchers. Carmine fibrin was dissolved by the liquor from both stimulated and non-stimulated pitchers, in the presence of 0.2 per cent hydrochloric acid. The protein derived from the globulin of the castor bean was usually dissolved by the liquor from both stimulated and non-stimulated pitchers in the presence of hydrochloric acid. The liquor from stimulated pitchers apparently hydrolyzed glycyltryptophane, provided the period of incubation was sufficiently long. The liquor from stimulated pitchers possessed proteolytic power in both the absence and the presence of acid, while that from the non-stimulated pitchers exerted no proteolytic power in the absence of acid, but had such power when acids were present. The proteolytic enzyme of the pitcher liquor undoubtedly plays a highly important rôle in the digestion of insects within the pitcher.—*John W. Harshberger.*

1512. Hepburn, Joseph Samuel, and Frank Morton Jones. **Occurrence of antiproteases in the larvae of the Sarcophaga associates of Sarracenia flava.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 460–463. 1919.—The pitcher liquor of *Sarracenia flava* contains a proteolytic enzyme. The larvae of certain species of *Sarcophaga* (*S. sarraceniae* Riley, *S. Rileyi* Aldrich, and *S. Jonesi* Aldrich) habitually occur in the pitchers of *Sarracenia flava*, where they are constantly bathed in the digestive liquor of the pitcher. This phenomenon suggested the examination of *Sarcophaga* larvae from *Sarracenia* for the presence of anti-proteases. After an account of the experiments the authors conclude: "In this study, antiproteases have been found in the larvae of the *Sarcophaga* associates of the pitcher plant, *Sarracenia flava.* The larvae of other species of *Sarcophaga*, and of several other dipterous genera, are likewise able to live and escape digestion in an environment rich in proteolytic enzymes; probably these larvae also contain antiproteases which protect them from digestion."—*John W. Harshberger.*

1513. Kopeloff, Nicholas, and Lillian Kopeloff. **Do mold spores contain enzymes?** Jour. Agric. Res. 18: 195–209. 1919.—This is a study with special reference to invertase in the spores of *Aspergillus niger*, *A. Sydowi*, *A. flavus*, and *Penicillium expansum*. Spores of these species heated to 63°C. for 30 minutes and shaken in sterilized sand caused a decrease in polarization and an increase in reducing sugars in a 10 per cent sugar solution in 3 hours and

continued to cause the same changes throughout a 4-day incubation period at 45°. Increase in the number of spores resulted in an increase in enzymic activity. The enzyme present exhibited the characters of invertase. The spores of *A. Sydowi* contain a gum-forming enzyme which parallels invertase activity.—The limit of concentration, when 100,000 to 400,000 mold spores per cubic centimeter of sugar solution are used, is between 18 and 24 per cent actual sucrose.—*D. Reddick.*

1514. McGinty, R. A. **Diastase activity in relation to stage of development and carbohydrate content of the tuber of Solanum tuberosum.** Ann. Missouri Bot. Gard. 6: 223–251. 1919. —Following a review of the literature on this subject there are reported results on experiments (1) to determine diastase activity in tubers at various periods of development; (2) to estimate the reducing sugars and sucrose by the method formulated by Davis, Daish, and Sawyer; and (3) to estimate starch by means of taka diastase. Diastase activity and starch content increase with the advance of tuber formation, while the sugar content decreases. Potato juice preserved with toluol for 24 hours at room temperature showed a marked decrease in diastatic activity. An activating agent which is not destroyed by boiling nor precipitated by alcohol is coenzymic with the diastase of potato juice.—*S. M. Zeller.*

1515. Northrop, J. H., L. H. Ashe, and R. R. Morgan. **A fermentation process for the production of acetone and ethyl alcohol.** Jour. Indust. Eng. Chem. 11: 723–727. 1919.—A commercial method for the manufacture of acetone and ethyl alcohol by means of a fermentation process of various sugars induced by a newly described organism, *Bacillus acetoethylicum*, is discussed.—*Henry Schmitz.*

1516. Onslow, Muriel Wheldale. **Oxidizing enzymes. I. The nature of the "Peroxide" naturally associated with certain direct oxidizing systems in plants.** Biochem. Jour. 13: 1–9. 1919.—A relationship is shown between the browning of injured tissue of certain plants and a direct oxidase reaction with guaiacum, likewise between those showing no browning and the direct oxidase reaction (requiring the presence of hydrogen peroxide). It is argued from experimental data that the direct oxidase reaction in tissues showing browning (such as pear fruit or potato tuber), is due to the presence of a peroxidase and an aromatic catechol group. On injury the peroxidase activates the oxidation of the aromatic with the formation of a peroxide, this system then bringing about the bluing of guaiacum.—The formation of the peroxidase-peroxide system can be prevented by the extraction of the aromatic, then reformation may be effected by again introducing the aromatic. It is held that plants not showing browning of tissue do not contain the catechol group.—*A. R. Davis.*

1517. Pringsheim, Hans, and Adelheid Magnus-von Merkatz. **Fermentversuche an Zellulose abbauprodukten. [Fermentation experiments with certain products of cellulose disintegration.]** Zeitschr. Physiol. Chem. **105**: 173–178. 1919.—Pringsheim and Magnus-von Merkatz point out the fact that dextrines from both starch and glycogen are split to maltose by diastase. They raise the question whether diastase has a similar effect on cellulose dextrine. By using Madsen's acetylization method they gained cellulose dextrine from cotton that was soluble in water and gave no osazone reaction. The dextrine thus obtained is strongly reducing to Fehling's solution and is considered by the authors as the end dextrine of cellulose. Diastase will not split cellulose dextrine. They also derived zellobiose by the Madsen method. The contents of the first stomach of cattle, the intestine and the pancreas bore no enzyme that would split zellobiose. They conclude that the splitting of this substance in the alimentary canal of the cattle must be due to cellulose bacteria.—*William Crocker.*

1518. Schmitz, Henry. **Studies in the physiology of the fungi. VI. The relation of bacteria to cellulose fermentation induced by fungi, with special reference to the decay of wood.** Ann. Missouri Bot. Gard. 6: 93–136. 1919.—Sawdust cultures, prepared from heart-wood of Douglas fir, western hemlock, white ash, and red oak, were inoculated with pure and mixed cultures of the following fungi and bacteria: *Fomes pinicola*, *Lenzites saepiaria*, *Polystictus versicolor*, *Bacillus vulgatus*, *B. vulgaris*, *B. coli*, *B. prodigiosus*, *Bacterium mycoides*, and

Azotobacter chroococcum. Some attention was given to the effect of autoclaving on wood. The percentage loss in weight in the sawdust was taken as a criterion of the rate of decay. A summary of the observations and experiments shows that (1) when wood is subjected to steam-pressure sterilization it is changed in color and resistance to decay and is accompanied by an increase in acidity and substances in the extract which reduce Fehling's solution. Under natural conditions cellulose-dissolving bacteria play no important part in the decay of wood although the rate of decay may be materially increased by the presence of the ordinary saprophytic bacteria. The decay of wood by fungi, as influenced by bacteria, is dependent on the fungus and wood species.—*S. M. Zeller.*

1519. Schmitz, Henry, and S. M. Zeller. **Studies in the physiology of the fungi. IX. Enzyme action in Armillaria mellea Vahl, Daedalea confragosa (Bolt.) Fr., and Polyporus lucidus (Leys.) Fr.** Ann. Missouri Bot. Gard. 6: 193–200. 1919.—The evident presence of lactase is the outstanding feature of the results on carbohydrates, this being the first record of its presence in higher fungi. A method involving hydrogen ion concentration determination is suggested for the detection of ammonia liberated by amidase.—*S. M. Zeller.*

1520. Sherman, N. C., and Dora E. Neum. **The proteolytic activity of pancreatic amylase preparations.** Jour. Amer. Chem. Soc. 41: 1855–1862. 1919.—In a previous paper the authors showed that their purified pancreatic amylase preparations exhibited marked proteolytic activity. The authors purified high grade commercial pancreatin by extracting with 50 per cent alcohol, precipitating this filtrate with alcohol-ether mixture, dissolving the precipitate with H_2O and precipitating with absolute alcohol, then dissolving and dialyzing in 50 per cent alcohol containing maltose to retard deterioration, and finally precipitating with an equal volume of 1:1 alcohol-ether mixture. To discover whether the amylase and protease activities are due to admixed substances, the authors substituted for the usual final precipitation with 1:1 alcohol-ether, a precipitation with an equal volume of a mixture of two parts alcohol to one of ether. The products obtained are called *A*. Another product *B* was obtained by adding more ether. *A* was separated by centrifugal force, the centrifuge being cooled with liquid air. The solution from precipitate *A* was decanted. "Typically the amylolytic activity of precipitate *A* was lower than that of precipitate *B;* but the latter was not more active than our usual amylase preparations. The proteolytic activity was higher in precipitate *A* than in precipitate *B.*"—*J. M. Brannon.*

1521. Sherman, H. C., and Florence Walker. **Influence of aspartic acid and asparagin upon the enzymic hydrolysis of starch.** Jour. Amer. Chem. Soc. 41: 1866–1873. 1919.—The starches used were potato, maize, and rice purified by washing in cold, very dilute sodium hydroxide and water. Merck's "soluble starch according to Lintner" washed nine times with ordinary distilled water and six times with triply distilled water was also employed. One hundred cubic centimeters of a 1 per cent dispersion, made neutral to rosolic acid with 0.01 N alkali or acid, were used for each digestion. The water extract of potato was obtained by letting one grated potato stand over night in 150 cc. of purified distilled water. This was filtered and the filtrate boiled. Its acidity was carefully determined, rosolic acid being used as an indicator. Other methods of procedure have been described in previous papers. "The action of saliva, pancreatin and purified pancreatic amylase on alkali-washed potato, wheat, maize and rice starches and Lintner's 'soluble' starch was accelerated by the addition of small amounts of boiled, neutralized water extract of potato, while the action of the vegetable amylases tested was not influenced." Neutralized aspartic acid or asparagin accelerated the action of saliva, pancreatin, and purified pancreatic and malt amylases. No clear evidence of activation was obtained from malt extract of *Aspergillus Oryzae.* The addition of sodium aspartate or asparagin produced practically the same activation.—*J. M. Brannon.*

1522. Shull, C. A. **Enzyme secretion.** [Rev. of: Robbins, W. J. **Influence of certain salts and nutrient solutions on the secretion of diastase by Penicillium camembertii.** Amer. Jour. Bot 3: 234–260. 1916.] Bot. Gaz. 67: 276–277. 1919.

1523. Stehle, R. L. **Some data concerning the alleged relation of catalase to animal oxidations.** Jour. Biol. Chem. 39: 403–420. 1919.—Until catalase has been shown to produce at least some of the changes which food or tissue undergoes in oxidative catabolism, the discovery that the quantity in which it exists in various tissues runs parallel with the oxidative activity of those tissues is not evidence that it takes part in those oxidations. An explanation is suggested for the variation in catalase content and the experimental evidence for the explanation is given. The explanation is that fluctuations in catalase content are due to fluctuations in the number of red cells in the blood. It seems simpler to regard catalase content as a function of the number of red cells than to assume a direct relation between catalase and biological oxidations.—*G. B. Rigg.*

1524. Wolf, Charles G. L. **Contributions to the biochemistry of pathogenic anaerobes. VI. The proteolytic action of Bacillus sporogenes (Metchnikoff) and Bacillus welchii.** Jour. Path. and Bact. 22: 270–288. 1919.—On a medium of sterilized muscle and water both organisms grow with great rapidity, and both form large quantities of carbon dioxide and hydrogen. With *B. sporogenes* about 70 to 75 per cent of the gas is carbon dioxide; with *B. welchii* about 38 per cent. The amount of gas formed per litre of medium is apparently about equal with both organisms. *B. sporogenes* has great proteolytic activity; with *B. welchii* there is relatively little proteolysis. A marked difference in volatile acid production was noted. *B. welchi* produces large quantities of such acids in carbohydrate-containing media, but no considerable amount with muscle tissue. *B. sporogenes* is capable of forming acids in quantity in any medium, irrespective of the carbohydrate content.—*W. W. Bonns.*

METABOLISM (RESPIRATION)

1525. Anonymous. **Do seeds breathe?** Sci. Amer. 120: 571. 1919.

1526. Baumgärtel, Otto. **Studien über Pneumatocarpien.** [Studies of inflated fruits.] Sitsungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 13–40. *Pl. 1, fig. 1–4.* 1917.—The bladder fruits (pneumatocarpien) of *Astragalus cicer* L., *Colutea halepica* Lam., *C. orientalis* Mill., *Nigella damascena* L., *Staphylea Bumaldea* D.C., and *S. pinnata* L. were studied from an anatomical and physiological standpoint. It was found that these inflated fruits contain a higher atmospheric pressure than the surrounding air which is thought to be the result of carbohydrate respiration within the unripe fruits. The inclosed gas, which may arise largely from certain tissues in some species and from different tissues of the fruit in other species, has a higher CO_2 content than the outside air. It is suggested that the biologic rôle of the inclosed atmosphere is to supply a moist medium around the developing seeds and also to aid in the development of a structure which will make wind dissemination of the fruit possible. A bibliography is given.—*W. C. Muenscher.*

1527. Crocker, William. **Respiration of stored wheat.** [Rev. of: Bailey, C. H., and A. M. Gurjar. **Respiration of stored wheat.** Jour. Agric. Res. 12: 685–713. 1918.] Bot. Gaz. 67: 180. 1919.

1528. Haas, A. R. C. **Respiration after death.** Bot. Gaz. 67: 347–365. *3 fig.* 1919.—The author reports the results of a study of the respiration of *Laminaria* after mechanical injury and after being killed by alcohol, acetone, formaldehyde, and ethyl bromide. The output of CO_2 was estimated by determining the increase in hydrogen ion concentration, following wounding or death. The method used was that of comparing the color produced when phenolsulphon phthalein was added to the solution to be tested with the colors of a series of buffer mixtures containing an equal amount of the same indicator. The author concludes from his results that the respiration of *Laminaria* after death may be considerably greater than in its normal condition.—*D. H. Rose.*

1529. Haas, A. R. C. **Effect of anesthetics upon respiration.** Bot. Gaz. 67: 377–404. *7 fig.* 1919.—When *Laminaria* is exposed to anesthetics in sufficiently high concentration to

produce any result, the initial effect is an increase of respiration. This may be followed by a decrease if the anesthetic is sufficiently toxic. No decrease of respiration is observed when the concentration is too low to be toxic. These results directly contradict the idea advocated by Verworn and his pupils that anesthetics act by decreasing respiration.—*A. R. C. Haas.*

1530. Harrington, G. T. **Respiration and age of plant organs.** [Rev. of: Nicolas, G. **Contribution à l'étude des variations de la respiration des végétaux avec l'age.** Rev. Gen. Bot. **30**: 214–225. 1918.] Bot. Gaz. **67**: 177–179. 1919.

1531. Herrmann. **Die Keimungsenergie des Kiefernsamens in Theorie und Praxis. [Germination-energy of pine seeds in theory and practice.]** Naturw. Zeitschr. Forst- u. Landw. **17**: 53–57. *Pl. 1–2.* 1919.—See Bot. Absts. 3, Entry 2026.

ORGANISM AS A WHOLE

1532. Allen, E. R. **Some conditions affecting the growth and activities of Azotobacter chroococcum.** Ann. Missouri Bot. Gard. 6: 1–44. *Pl. 1, fig. 1–2.* 1919.—Allen reports experimental data which suggest that "some of the markedly beneficial results observed in cultural solutions" by previous workers are related to phosphorus nutrition of the organism and to maintenance of the proper reaction of the medium. Experiments on the removal and restoration of the solid phase of those culture media which produce a precipitate and on the use of media which form no precipitate, as well as those with agar as a protective colloid, are suggestive; but the author feels that they give no final proof of the mechanism of the increase in growth of *Azotobacter chroococcum.* The beneficial effect of the agar might be explained by the presence of certain nutrients in the agar but this seems less plausible than to consider the agar as a protective colloid. One of the many difficulties which stands in the way of the proper development of this line of investigation is the interference of colloids. When colloidal hydrated ferric oxide is used in culture media duplicate results do not check and it is thus difficult to duplicate the work of another investigator where colloids are used. The method of measuring growth for a short incubation period proved to be the only reliable method to be used when dealing with *Azotobacter,* but wholly inadequate to permit a rigid examination of the influence of different conditions. Bonazzi's method of repeatedly renewing the energy supply and measuring the products of growth of nitrite-producing bacteria is far superior but not applicable to *Azotobacter* cultures. Since the presence of phosphates and the absence of an acid reaction are known requirements of the culture medium they should be studied in detail before further speculative theories are advanced.—*S. M. Zeller.*

1533. Baud, Paul. **Les nouveaux modes d'emploi des Mucédinées dans les industries agricoles. [New modes of employing molds in the agricultural industries.]** Chimie et Industrie 1919[7]. *9 p. 1 fig.* 1919.

1534. Brierly, W. B. **Some concepts in mycology—an attempt at synthesis.** Trans. British Mycol. Soc. **6**: 204–235. 1919.—See Bot. Absts. 4, Entry 1061.

1535. Brown, W. H. **Vegetation of Philippine mountains. The relation between the environment and physical types at different altitudes.** Philippine Bur. Sci. Publ. 13. *434 p. Pl. 1–41, fig. 1–30.* 1919.—See Bot. Absts. 4, Entry 180.

1536. Church, A. H. **The plankton-phase and plankton-rate.** Jour. Bot. Suppl. III. *8 p.* 1919.—See Bot. Absts. 4, Entry 182.

1537. Feilitzen, H. von. **Cultural experiments on moor lands.** Jour. Amer. Peat Soc. **12**: 216–217. 1919.—See Bot. Absts. 4, Entry 64.

1538. Henderson, William F. **Some experiments conducted with pure cultures of bread yeast.** Trans. Amer. Microsc. Soc. **38**: 221–227. *Pl. 23, 24.* 1919.—See Bot. Absts. 4, Entry 1108.

1539. Hunter, Albert C., and Charles Thom. **An aerobic, spore forming bacillus in canned salmon.** Jour. Franklin Inst. 188: 136. 1919.

1540. MacDougal, D. T., H. M. Richards, and H. A. Spoehr. **Basis of succulence in plants.** Bot. Gaz. 67: 405–416. 1919.—See Bot. Absts. 4, Entry 244.

1541. Mondino, Alfonsino. **Ricerche anatomiche e morphologiche sulla var. "tuberosa" Asch. dell "Arrhenatherum elatius" M. K. nuovamente trovata in Piemonte. [Anatomical and morphological investigation of var. tuberosa Asch. of Arrhenatherum elatius M. K. recently found in Piedmont.]** Atti. R. Accad. Sci. Torino 54: 782–794. 1919.—See Bot. Absts. 4, Entry 988.

1542. Moreau, F. M., and Mme. F. Moreau. **Recherches sur les lichens de la famille Peltigeracees. [Researches on the lichens of the family Peltigeraceae.]** Ann. Sci. Nat. Bot. X. 1: 29–32. 1919.—See Bot. Absts. 4, Entry 1130.

1543. [Nordstedt, C. F. O.] [Swedish rev. of: Murbeck, Sv. **Beiträge zur Biologie der Wüstenpflanzen. [Contribution to our knowledge of the biology of desert plants.]** Lunds Univ. Arsskr. 14: 36. 1919.] Bot. Notiser 1919: 166. 1919.

1544. Petersen, Henning E. **Maglemose i Grib Skov. Undersogelser over Vegetationen paa en nords jaellandsk Mose. [High moors in the woods of Gribs Skov. Investigation of the vegetation of a northern moor.]** Bot. Tidsskr. 36: 57–154. *Pl. 1–17, fig. 1–18.* 1917.

1545. Pringsheim, Ernst G. **Die Kultur der Desmidiaceen. [The culture of Desmidiaceae.]** Ber. Deutsch. Bot. Ges. 36: 482–485. 1918.—Twelve species of Desmidiaceae and four species of Mesotaeniaceae were obtained in pure culture from fresh material and grown on silica jelly which had been flooded with a nutrient solution of a 0.1 per cent KNO_3, 0.02 per cent K_2HPO_4, .02 per cent $MgSO_4$. For liquid cultures, soil decoctions were used first and later nutrient media. The purity of the distilled water is a factor of great importance if successful results are to be obtained. The reaction of the medium must be neutral or slightly basic; the concentrations of the solution must not be high. KNO_3 or $Ca(NO_3)_2$ in 0.1 per cent solution is the maximum for best growth. Ammonium salts are less suited. Best growth was obtained with calcium nitrate as a source of nitrogen. Leaving calcium out of the nutrient medium had no visible effect because enough of the metal is obtained from the glass containers. *Mesotaenium*, however, grew very poorly in the absence of calcium.—*Ernst Artschwager.*

1546. Rose, D. H. **Blister canker of apple trees; a physiological and chemical study.** Bot. Gaz. 67: 105–146. 1919.—The author finds that apple bark attacked by *Nummularia discreta* has about twice the oxidase activity of healthy bark. Measurements were made with the simplified Bunzell asparatus. Oxidation in the apparatus comes to an end only after several days instead of after a few hours, as stated by Bunzell. This gradual slowing down is shown to be due, in part at least, to increasing hydrogen ion concentration, brought about by the oxidation process itself. The equilibrium reached seems to be a false one, which can be disturbed by the addition of either fresh oxidase reagent or fresh plant material. When tested by the formula for a monomolecular reaction the oxidation figures give fairly constant values for k, thus indicating a linear relation between time and amount of change. Results for catalase determinations are said to show some discrepancies, but justify the general statement that the more severely the bark is attacked by the fungus the greater is its catalase activity. Tests with the fungus in pure culture show that it possesses both oxidase and catalase activity. Macro-chemical tests show that diseased bark has a higher percentage of dry matter, lipoids, alcohol-water-insoluble residue and total nitrogen, but a lower percentage of alcohol-water-soluble material than healthy bark. The percentage of carbohydrates in both tissues seems to be about the same. The tannin content of diseased bark was slightly less than that of healthy bark. The greater oxidase activity of diseased bark is thought by the author to be due to the combined activity of the oxidase of fungus and host to lower acidity (P_H 5.61 for diseased bark, and P_H 5.15 for healthy bark) and possibly to a greater degree of dispersion of the oxidizing agent.—*D. H. Rose.*

1547. Stone, A. L. **Testing of newly harvested field seed is difficult problem.** Seed World 5[10]: 37. 1919.—See Bot. Absts. 4, Entry 129.

1548. Sumner, F. B. **Adaptation and the problem of organic purposefulness. II.** Amer Nat. 53: 338–369. 1919.—See Bot. Absts. 3, Entries 2202, 2518.

1549. Waldron, Ralph Augustus. **The peanut (Arachis hypogaea) its history, histology, physiology, and utility.** Contrib. Bot. Lab. Univ. Pennsylvania 4: 301–338. *Pl. 79–80.* 1919.—See Bot. Absts. 4, Entry 139.

1550. Waterman, W. G. **Development of root systems under dune conditions.** Bot. Gaz. 68: 22–53. *17 fig.* 1919.

1551. Wolf, Charles G. L. **Contributions to the biochemistry of pathogenic anaerobes. VII. The biochemistry of Bacillus proteus.** Jour. Path. and Bact. 22: 289–307. 1919.—*Bacillus proteus* grown under various media (peptone, glucose peptone, milk, cooked meat, sterile urine) does not exhibit the qualities of a putrefactive organism. Compared with *B. sporogenes* and *B. histolyticus* its proteolytic activities are not great. As a gas former, its action is moderate. The volatile acid production is small. The two strains of the organism studied attacked lactose. The presence of an active urease capable of transforming 45 per cent of the total nitrogen of urine into ammonia was demonstrated. No indol was found under the most favorable conditions for its development.—*W. W. Bonns.*

GROWTH, DEVELOPMENT, AND REPRODUCTION

1552. Chandler, W. H. **Pruning—its effect on production.** Trans. Indiana Hortic. Soc. **1918**: 137–145, 156–161. 1919.—See Bot. Absts. 4, Entry 908.

1553. Crocker, William. **Conditions affecting flower development.** [Rev. of: (1) Klebs, George. **Ueber die Blütenbildung von Sempervivum.** Festschrift zum Ernst Stahl. *P. 138–151.* Jena, 1918. (2) Fischer, H. **Zur Frage der Kohlensäure-Ernahrung der Pflanzen.** Gartenflora **65**: 232–237. 1916. (3) Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p.* 1918.] Bot. Gaz. **67**: 445–446. May, 1919.—"These papers have thrown much light on some of the nutrient factors modifying vegetation and reproduction in plants. The contribution of Kraus and Kraybill apparently puts into the hands of producers one of the important means of controlling fruitfulness. Fischer's less extensive and one-sided attack caused him to miss the fact that a very high C/N not only reduces vegetative growth but diminishes reproduction." [See Bot. Absts. 1, Entry 1402; 2, Entry 601.]—*H. C. Cowles.*

1554. Crocker, William. **Wound callus and bacterial tumor.** [Rev. of: Magnus, Werner. **Wund-Callus and Bakterien-Tumore.** Ber. Deutsch. Bot. Ges. **36**: 20–29. 1918 (See Bot. Absts. 2, Entry 610).] Bot. Gaz. **67**: 516–517. 1919.

1555. Ensign, M. R. **Venation and senescence of polembryonic citrus plants.** Amer. Jour. Bot. **6**: 311–329. *6 fig.* 1919.—It is known that in polyembryonic seeds of *Citrus* one of the embryos is gametic and the others apogamous. Hence a study of the comparative size of vein-islets in the leaves of a pair of seedlings produced from a single seed may afford evidence of the dependence of rejuvenescence on sexual reproduction. Germination tests show that 43 per cent of the seeds of *Citrus grandis* produce more than one hypocotyl. The size of the vein-islet is constant for all parts of a given leaf; it increases slightly as the leaf matures; in mature leaves it is the same in healthy and chlorotic plants, and in large and small leaves; finally, it is identical in the mature leaves of two seedlings produced from a polyembryonic seed. The nucleo-cytoplasmic ratio, which has been thought to be a criterion of cell-age, is essentially the same in the root meristems of gametic and apogamous plants. Differences in vigor in members of a pair of seedlings are due to differences in cotyledon-size rather

than to differences in degree of senescence. The explanation of these results may be that the parent plant was not old enough to show measurable senescence compared to its rejuvenated offspring; that the venation character is not correlated with age in this species; or that rejuvenescence is not a function of sexual reproduction. The author inclines to the latter interpretation, holding that the "undifferentiation" which is the essential feature of rejuvenescence occurs in the reduction of the organism to a unicellular embryo, and is independent of the stimulus, sexual or otherwise, which initiates growth.—A new method for clearing and staining leaves is described.—*G. S. Torrey.*

1556. Findeis, Marie. **Über das Wachstum des Embryos im ausgesäten Samen vor der Keimung. [On the growth of the embryos in sown seeds before germination.]** Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) **126**: 77–102. *2 pl.* 1917.—See Bot. Absts. 4, Entry 987.

1557. Gertz, Otto. **Panachering hos Mercurialis perennis L. En morfologisk, anatomisk och mikrokemisk studie. [Variegation in Mercurialis perennis L.]** [Swedish, with German résumé.] Bot. Notiser **1919**: 153–164. *Fig. 1–23.* 1919.—The studies were carried out in the Beechwoods of Torup, Skåne, Sweden, from 1907 to 1917. The partly chlorophyll-free leaves were confined to specimens growing in a very restricted area, and it seemed as if these specimens had developed by budding from the rootstock of one original mother-plant, though a few normal specimens were growing in the clump. The variegation consisted sometimes in a chlorophyll-free marginal zone, 2 mm. wide of variable length, sometimes in larger or smaller white blotches. The epidermal cells were much larger in the normally developed portion of the leaves, the ratio being on the upper side 2.6:1 and on the lower side 2.7:1. The shape of the cells was often changed, and the cell-walls, normally very sinuate, often became straight in the white fields, especially in the region of tension between the different colored fields. The stomata, which are found on the lower surface, were often irregular or only partly developed in the white fields. There were also differences in the thickness of the blades, the normally developed fields being thicker, the ratio being 1.5:1 up to 2.1:1. The palisade cells on the upper surface had become depressed in the white fields and more like the epidermal cells. The parenchyma-cells and the vessels showed also some differences. The white fields lacked as a rule starch, except in the cells of the stomata. In cultures of chlorophyll-free pieces in glucose-solution, starch was formed, however. The white fields contained less albumen. *Mercurialis perennis* gives excellent material for studies of Molisch's "kalium-karotin" reactions. Reference literature, 7 articles. [See Bot. Absts. 3, Entry 2126.]—*P. A. Rydberg.*

1558. Hart, E. B., and H. Steenbock. **Maintenance and reproduction with grains and grain products as the sole dietary.** Jour. Biol. Chem. **39**: 209–233. *Charts 1–13.* 1919.—Grains and their products used as the sole articles of diet proved insufficient for maintenace (growth was not experimented on) and reproduction in the animal experimented on. Broad generalizations must not be made from experiments on a few species.—*G. B. Rigg.*

1559. Illick, J. S. **When trees grow.** Amer. Forest. **25**: 1386–1390. *9 fig.* 1919.—See Bot. Absts. 4, Entry 437.

1560. MacDougal, D. T. **Growth in organisms.** Science **49**: 599–605. 1919.—In this address, delivered before the Pacfic Division of the American Association for the Advancement of Science, at Pasadena, June 19, 1919, the writer considers the subject according to the following brief: (1) The development of an organism from the spore or embryonic stage includes the processes of auxesis or enlargement and of differentiation. (2) Living matter is conceived to be composed mainly of pentosans and albumins or albumin derivatives. (3) The principal and characteristic substances of the two groups are practically non diffusible, and hence come together only as an intimate mixture in a colloidal condition. (4) Growth of living matter consists of hydration with accompanying swelling and of accretion of solid matter. (5) The hydration of the substances belonging to the two main components is affected in an opposite manner by hydrogen ions, and is variously modified by temperature and

other conditions. (6) Accretions of new material include the absorption of salts which tend to restrict hydration and the incorporation of amino-compounds. So-called nutrient salts do not constitute food but may act as catalysts or releasers of energy in other substances and as controls. (7) The enlargement of cells is almost entirely by the swelling which results from hydration in their earlier stages, and later the enlargement of the syneretic cavities in the colloidal structure is followed by the distending or stretching action of osmotic pressures in the vacuoles thus formed. (8) Illustrations are afforded by records of growth of leafy stems, joints of cacti, fruits of *Solanum*, and trunks of trees.—*A. H. Chivers.*

1561. Molisch, Hans. **Über das Treiben von Wurzeln.** [Forcing of roots.] Sitzungsber. K. Akad. Wiss. Wien (Math.-Nat. Kl.) 126: 3-12. *Pl. 1-2, fig. 1-4.* 1917.—The author used freshly cut three year old twigs of *Salix*, *Populus*, *Philadelphus coronarius*, and *Viburnum opulus*. Adventitious roots were freely formed by these branches after their leaf and flower buds were forced by exposure to tobacco or paper smoke or a warm water bath in late autumn. —*W. C. Muenscher.*

1562. Nagai, Isaburo. **The correlation in the differentiation of sex in the fern prothallia.** Bot. Mag. Tokyo 33: 157–170. 1919.—A continuation of the author's studies of the effect of light and nutrient media on the development of sex organs in ferns. Spores were sowed on 0.25 per cent, 0.5 per cent, and 1 per cent Knop's solution and grown in good light and in weak light. Cultures in weak solutions and weaker light produce antheridia but no archegonia. Better light and stronger media induce the formation of an apical meristem followed by the development of archegonia. Though the prothallia of *Blechnum nipponicum* are monoeceous in nature, they are strongly dioecious in these cultures. The author argues that the evidence indicates the presence in each protoplast of a determiner for antheridia and one for apical meristem and archegonia, one of which is prevented from functioning by an inhibitor.—*Leonas I. Burlingame.*

1563. Zeller, S. M., H. Schmitz, and B. M. Duggar. **Studies in the physiology of the fungi VII. Growth of wood-destroying fungi on liquid media.** Ann. Missouri Bot. Gard. 6: 137–142. 1919.—Experiments undertaken to determine (1) which wood-destroying fungi are adapted to growth on liquid media, (2) what liquid media are suitable for their growth, and (3) the influence of the hydrogen ion concentration of the media indicate that (1) many wood-destroying fungi are not suitable for growth experiments with liquid media; (2) there is a decided indication of the desirability of selecting a specific medium for each fungus; and (3) that the H-ion concentration does not seem to be the only limiting factor in growth.—*S. M. Zeller.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1564. Crocker, William. **Turgor movements.** [Rev. of: Blackman, V. H., and S. G. Paine. **Studies in the permeability of the pulvinus of Mimosa pudica.** Ann. Botany 32: 69–85. 1918 (See Bot. Absts. 1, Entry 175).] Bot. Gaz. 67: 278. 1919.

1565. Crocker, William. **Phototropism.** [Rev. of: Parr, Rosalie. **Response of Pilobolus to light.** Ann. Botany 32: 177–205. 1918.] Bot. Gaz. 67: 272–273. 1919.—The author is strongly commended for an excellent piece of quantitative work in a field in which such work has been largely absent. [See Bot. Absts. 1, Entry 1656].—*H. C. Cowles.*

1566. Crocker, William. **Geotropism and phototropism.** [Rev. of: Van Ameijden, U. P. **Geotropism and phototropism in the absence of free oxygen.** Recuéil Trav. Bot. Néerland. 14: 149–218. 1917. *Pl. 15–16, fig. 1.*] Bot. Gaz. 67: 184. 1919.

1567. Crocker, William. **Statolith starch.** [Rev. of: Zollikofer, Clara. **Über das geotropische Verhalten entstärkter Keimpflanzen und den Abbau der Stärke in Gramineenkoleoptilen.** Ber. Deutsch. Bot. Ges. 36: 30–38. 1918 (See Bot. Absts. 2, Entry 607).] Bot. Gaz. 67: 520. 1919.

1568. Nienburg, Wilhelm. **Über phototropische Krümmungen an langsseitig zum Teil verdunkelten Avena-Koleoptilen. [Phototrophic curvature of the coleoptile of Avena which was subjected to partial lateral shading.]** Ber. Deutsch. Bot. Ges. **36**: 491–500. 1919.—Experiments carried on with *Avena* seedlings support the view of Darwin that phototrophic reactions are dependent on sensitiveness to differences of illumination and not on the direction of the light source. In agreement with the observations of Blaauw, the mechanism of the curvature is to be sought in a decreased growth on the side exposed to the light.—*Ernst Artschwager.*

1569. Shull, C. A. **Orientation of roots.** [Rev. of: Holman, Richard M. **(1) The orientation of primary terrestrial roots with particular reference to the medium in which they are grown. (2) Influence of the medium upon the orientation of secondary terrestrial roots.** Amer. Jour. Bot. **3**: 274–318, 407–414. 1916.] Bot. Gaz. **67**: 376. 1919.

1570. Stark, P. **Das resultanten Gesetz beim Haptotropismus. [The resultant law in haptotropism.]** Jahrb. Wiss. Bot. **58**: 475–523. *22 fig.* 1919.—The experiments were carried on with seedlings of *Avena sativa, Hordeum vulgare,* and *Agrostemma Githago.* It was found that in case a single flank was sensitized the degree of response was in direct proportion to the amount of stimulus applied. If two flanks were sensitized equally strong, the curvature was in the direction of the bisector of the angle, but the greater the angle between the two flanks, the less definite was the response and the greater was the deviation from the mean. Increasing the size of the angle and at the same time increasing the stimulus resulted in the same percentage of curvature, but the differences in the deviation from the mean remained the same. Keeping the angle between the two flanks constant and increasing the amount of stimulus results in an increase in the percentage of curvatures and in a decrease in the deviation from the mean of the bisector of the angle. If the two flanks are unequally stimulated, the angle of curvature will be determined by the parallelogram of forces. The deviation from the mean is usually below the value of 1°, at most 1.9°. The same is true if three or four flanks are sensitized equally or unequally, The deviation from the mean is usually below 1°. However, this does not always hold true. Sometimes it happens that the curvature takes place in the direction of the greater sensitized flank.—*E. F. Artschwager.*

GERMINATION, RENEWAL OF ACTIVITY

1571. Crocker, William. **Secondary dormancy in seeds.** [Rev. of: Kidd, F., and C. West. **The controlling influence of carbon dioxide. The production of secondary dormancy in seeds of Brassica alva following treatment with carbon dioxide and the relation of this phenomenon to the question of stimuli in growth phenomena.** Ann. Botany **31**: 457–487. 1917.] Bot. Gaz. **67**: 269–270. 1919.

1572. Crocker, William. **Light and germination.** [Rev. of: Lehmann, Ernst. **Über die minimal Belichtungszeit welche die Keimung der Samen von Lythrum Salicaria auslöst.** Ber. Deutsch. Bot. Ges. **36**: 157–163. 1918 (See Bot. Absts. 2, Entry 611).] Bot. Gaz. **67**: 520. 1919.

1573. King, Charlotte M. **"Time and season" among the trees.** Rept. Iowa State Hortic. Soc. **53**: 416-417, 1918.—A brief discussion of rest period and of phemologic data on trees.—*L. H. Pammel.*

1574. Rose, R. C. **After-ripening and germination of seeds of Tilia, Sambucus and Rubus.** Bot. Gaz. **67**: 281–309. 1919.—Air-dry seeds of *Tilia americana, Sambucus canadensis* and *Rubus Idaeus* do not germinate when placed on a moist substratum at room temperature. In no case does water-absorption seem to be the limiting factor. Air-dry seeds planted in the soil over winter gave low percentage of germination. The author states that for *Tilia,* dormancy is not due to the seed-coats but to an actually dormant endosperm or embryo or both. Seeds after-ripened at temperatures slightly above freezing germinate readily at 10°

to 12°C., but very poorly at room temperature. The hydrogen-ion concentration was found to increase as after-ripening progressed. For *Sambucus* the highest germination (77 per cent) was obtained by layering fresh seeds out-of-doors over winter. No satisfactory forcing agent was found. Drying probably injures the seeds somewhat but is not the only cause for their poor germination. What other cause or causes there may be the author has not been able to determine. Dormancy in *Rubus* is thought to be due to the high breaking strength of the endocarp. Ready germination was obtained with seeds that had been treated with concentrated H_2SO_4 for two hours, rinsed in an excess of cold water, the remaining acid neutralized with sodium bicarbonate and the seeds rinsed again with water.—*D. H. Rose.*

1575. Webb, R. W. **Studies in the physiology of the fungi X. Germination of the spores of certain fungi in relation to hydrogen ion concentration.** Ann. Missouri Bot. Gard. 6: 201–222. *Fig. 1–5.* 1919.—Spores of *Aspergillus niger*, *Penicillium cyclopium*, *Fusarium* sp., *Botrytis cinerea*, and *Lenzites saepiaria* were germinated in solutions of M/5 mannite which were adjusted to various P_H values by use of ortho-phosphoric acid and sodium hydroxide solutions. For all of the fungi studied, with the possible exception of *Fusarium*, the optimum active acidity for germination was on the acid side of neutrality, inhibition being evidenced at or above P_H 2.8. Hydroxyl ions appear to be relatively more toxic than hydrogen ions.—*S. M. Zeller.*

REGENERATION

1576. Coulter, J. M. **Regeneration in Phegopteris.** [Rev. of: Brown, Elizabeth W. **Regeneration in Phegopteris polypodioides.** Bull. Torr. Bot. Club **45**: 391–397. *3 fig.* 1918 (See Bot. Absts. 2, Entry 737).] Bot. Gaz. **67**: 183. 1919.

1577. Massart, Jean. **Sur la polarité des organes végétaux. [On the polarity of plan. organs.]** Bull. Biol. France et Belgique **101**: 475–483. *8 fig.* 1918.—The author gives results obtained from experiments made upon polarity dealing with 30 different species of plants. He concludes that there is no uniformity in the polarity of stems; that branches are more sharply localized than roots; that root polarity determines not only the point of origin of new roots, but also provides for the absorption of liquids at the proximal end and the transmission of these liquids toward the distal end; and that the loss of root polarity is correlated with the habit of the plant. Further experiments were conducted to ascertain the effect of various external stimuli upon polarity. These were so controlled that opposing factors, such as light and darkness, dryness and humidity, etc., were forced to exert their influence in different combinations. Three species were employed, and six different combinations were arranged for each species. The results obtained are indicated diagrammatically.—*P. D. Strausbaugh.*

1578. Taylor, William Randolph. **On the production of new cell formations in plants.** Contrib. Bot. Lab. Univ. Pennsylvania **4**: 271–299. *Pl. 71–78.* 1919.—See Bot. Absts. 3, Entry 2450.

TEMPERATURE RELATIONS

1579. Åkerman, Å. **Vaxternäs köld-död och frost-härdighet. [Winter killing and frost-resistance of plants.]** Sver. Utsadesf. Tidskr. **29**: 61–85. 1919.—This is a discussion of the more practical aspects of the problem of tissue injury and death due to low temperature. Previous work is reviewed. Experiments are described bearing on the temperature curve of freezing tissue, on the effect of rapid thawing, on the effect of previous exposure to high or low temperatures, and on the relation of killing temperature to carbohydrate content. Constant low temperatures are maintained with the aid of carbohydrates. Results of sugar determinations of different varieties of winter wheat show that the more resistant varieties have a higher sugar content. The practicability of the use of relative sugar content as an index of probable winter resistance in breeding for winter resistance in cereals is also discussed.—*E. G. Anderson.*

1580. Anonymous. **Measuring the temperature of leaves.** Sci. Amer. 120: 365. 1919.

1581. Bruett, E. M. **Utility of blanching in food canning; effect of cold shock upon bacterial death rates.** Jour. Indust. Eng. Chem. 11: 37–39. 1919.—No evidence is found that heat and cold shock increase the susceptibility of bacterial spores to heat, for the death rates of such bacteria are not increased during a second heating beyond the death rates of "unshocked" bacteria subjected to the same temperature.—*H. Schmitz.*

1582. Burgess, J. L. **Relation of varying degrees of heat to the viability of seeds.** Bull. North Carolina Dept. Agric. 40^6: 9–11. 1919.—Record of experiments with seeds of garden beans, cowpeas, soybeans, corn, oats, rye, and wheat, exposed at varying temperatures for varying lengths of time to test influence on viability.—*F. A. Wolf.*

1583. Chandler, W. H. **The effect of cold winter of 1917–18 on the fruit industry.** Trans. Indiana Hortic. Soc. 1918: 91–103. *1 pl.* 1919.—See Bot. Absts. 4, Entry 908.

1584. Child, C. M., and A. W. Bellamy. **Physiological isolation by low temperature in Bryophyllum and other plants.** Science 50: 362–365. 1919.—It has long been known that in axiate plants a physiologically active growing tip more or less completely inhibits the development of other growing tips or axes of the same plant. As regards the manner in which such an effect of one part upon another may be produced, there are three possibilities: first, the growing tip may inhibit by obtaining the greater proportion of nutritive material; second, the inhibiting part may produce substances which are transported by the fluids of the plant to other parts; and third, the activity of the inhibiting part may produce dynamic changes which are conducted through the protoplasm and influence the physiological condition of other parts. Serious objections to the first two explanations are cited. Extensive experiments have been performed by the authors on *Bryophyllum*, *Phaseolus multiflorus*, *Phasaeolus macrocarpus*, and *Saxifraga sarmentosa.* In these experiments low temperature was used as a block to the action of the growing tip upon other parts of the plants. In *Bryophyllum* when a length of 2 to 3 cm. of the petiole is kept at a temperature of 2.5° to 3°, and the leaf immersed in water, the notches will develop into plants. In experiments on varieties of beans, the buds in the axils of the cotyledons could be induced to develop when a length of 2 to 3 cm. of the stem above the cotyledons was inclosed in the coil at 3°, 4° or even 5°C. It appears at least highly probable that the inhibiting action of growing tip, leaf, or other active region depends for its passage from point to point upon metabolically active protoplasm, rather than upon purely physical transportation through preformed channels.—*A. H. Chivers.*

1585. Greene, Laurenz. **1917–1918 winter injury to apple trees.** Rept. Iowa State Hortic. Soc. 53: 119–124. *2 pl.* 1918.—See Bot. Absts. 4, Entry 926.

1586. Hibbard, R. P. **Temperature and crops.** [Rev. of: Seely, D. A. (1) **Relation between temperature and crops.** Monthly Weather Rev. 45: 354–359. 1917. (2) **The length of the growing season in Michigan.** Michigan Acad. Sci. Rept. 20: 223–232. *Fig. 22–25.* 1918.] Plant World 21: 329–330. 1918.

1587. Johnston, Earl S. **An index of hardiness in peach buds.** Amer. Jour. Bot. 6: 373–379. *Fig. 1–2.* 1919.—In attempting to find a criterion for determining the degree of hardiness in the peach, the author has studied the moisture content in the fruit buds of two varieties, the Elberta and the Greenboro, during the winter and early spring. He notes a marked increase in water content in both varieties beginning about February 1, a condition which he believes is related to the fact that peach fruit buds are always very "tender" in early spring. No important differences were noted between trees receiving various fertilizer treatments or between those on high ground and those on low ground. The water content of Elberta buds is consistently higher than that of Greensboro and this difference increases as the season advances. Since the Elberta is considered less hardy than the Greensboro, these facts are believed by the author to be significant as indicating that low water content is associated with increased hardiness.—*E. W. Sinnott.*

1588. Jones, L. R., and H. H. McKinney. **The influence of soil temperature on potato scab.** Phytopath. 9: 301-302. 1919.—See Bot. Absts. 4, Entry 1308.

1589. Livingston, B. E. **Frost injury.** [Rev. of: Harvey, R. B. **Hardening process in plants and development from frost injury.** Jour. Agric. Res. 15: 83-111. *Pl. 7-11*, and *4, 3 fig.* 1918.] Plant World 21: 299-300. 1918.

1590. Pammel, L. H. **Effect of winter on shrubs at Ames, Iowa.** Rept. Iowa State Hortic. Soc. 53: 39-41. 1918.—See Bot. Absts. 4, Entry 868.

1591. Stevens, Neil E., and C. H. Higgins. **Temperature in relation to quality of sweet corn.** Jour. Agric. Res. 17: 275-284. *1 fig.* 1919.—The conclusions of Appleman and Arthur (Jour. Agric. Res. 17: 137-152. 1919) that the rate of loss of sugar in picked sweet-corn increases with a rise in temperature are confirmed. A different variety, Early Bantam, was used.—The rate of respiration of picked corn also varies with temperature, being greater at higher temperatures, at least up to 30°.—The temperature of green corn on the stalk is near that of the air, if shaded, and higher if in the sun.—The average temperature of the corn picking season in Maryland (August) is much higher than the corresponding season in Maine (September) and this difference is sufficient to allow considerably greater deterioration in picked corn in Maryland during a given period. Under identical conditions of practice corn preserved in Maine (north) would be superior (sweeter) to that canned in Maryland (south).—*D. Reddick.*

1592. Vass, A. F. **The influence of low temperature on soil bacteria.** Cornell Univ. Agric. Exp. Sta. Mem. 27: 1039-1074. 1919.—Using field soils, a study is made of the effect of the rate of thawing, alternate freezing and thawing, and the length of time frozen on the number of soil bacteria as shown by the agar plate. The increased count in frozen soils is attributed to a breaking up of the clumps of bacteria. *Bacillus radicicola* in soil culture does not seem to be affected by freezing. In nutrient solutions concentrations of dextrose and glycerin of one per cent and above exert a protective influence against low temperature. [See Bot. Absts. 4, Entry 1648.]—*W. H. Chambers.*

1593. Waldron, C. B. **Factors in hardiness.** Rept. Iowa State Hortic. Soc. 53: 115-119. 1918.—Summarizing his discussion the author says: "Hardiness then, as we use the term, is a quality so fundamentally inherent in plants as to be modified little or not at all by selection over reasonable periods of time." Early maturity is another factor. Winter killing is frequently caused by sudden freezing of roots not fully matured. More attention should be given to the origin of plants. In breeding, one of the plants should be of known hardiness.—*L. H. Pammel.*

RADIANT ENERGY RELATIONS

1594. Anonymous. **How plants and animals utilize color. Pigments that protect living matter against radiation.** Sci. Amer. Supplem. 87: 102. 1919.—A review of the more recent literature, with bibliography.—*Chas. H. Otis.*

1595. Coulter, J. M. **The luminous moss.** [Rev. of: Yasumochi, Toda. **Physiological studies on Schistostega osmundacea (Dicks) Mohr.** Jour. Coll. Sci. Tokyo 40: No. 5. *30 p. 2 pl.* 1918.] Bot. Gaz. 67: 278-279. 1919.—See Bot. Absts. 1, Entry 739.

1596. de Besterio, Dolores C., and Michel-Durand. **Influence de la lumiere sur l'absorption des matieres organiques du sol par les plantes.** [**Influence of light on absorption of organic compounds.**] Compt. Rend. Acad. Sci. Paris 168: 467-470. 1919.—Plants of *Pisum sativum* were grown in cultures on Knop's solution, to which 4 parts glucose per 1000 were added, the roots developed under aseptic conditions, the tops being free in the air. Cultures were exposed to light intensities corresponding to $\frac{1}{5}$, $\frac{1}{3}$, $\frac{1}{2}$ and complete sunlight. The dry weights of the entire plants, as well as the roots, increased with the light intensity. The

amount of glucose absorbed from the solutions was greatest under conditions of greatest illumination. The same weight of roots absorbed more sugar in weak illumination than in strong illumination, but for the whole plant the same weight absorbed practically the same amount of glucose in the various light intensities.—The pea is thus incapable of augmenting the absorbing power of the roots in a manner that would enable it to take up a greater quantity of organic carbon from the soil. No compensation or parallelism exists between the use of CO_2 by the leaves and absorption of organic compounds by the roots.—*F. B. Wann.*

1597. Hamilton, A. G. **The effect of sunlight on plants.** Australian Nat. **4**: 89–90. 1919.—See Bot. Absts. 4, Entry 224.

1598. Lagerberg, Ivar. **Vergleichende Untersuchungen über die Widerstandsfähigkeit der Sporen und der vegetativen Formen einiger sporenbildender Bakterien gegenüber ultraviolett Licht. IV. Mitteilung über die Wirkung der ultravioletten Strahlen. [Comparative studies of the resistance of spores and vegetative forms of spore-forming bacteria to ultra-violet light. IV. On the action of ultra-violet rays.]** Zeitschr. Immunitätsforsch **28**: 186–197. 1919. —Using *Bacillus subtilis*, *B. mesentericus*, *B. megatherium*, and two strains of *B. anthracis*, the effects of ultra-violet light were tested in the usual way. Death occurred sooner when spores and vegetative cells were dry, with little difference between them. Moist spores of *B. anthracis* resisted the rays 8 to 10 times as long as dry spores, but the other bacteria did not show this effect. The vegetative cultures were 6 hours from spores at 36°C. and were tested for the presence of spores by treatment with 3 per cent formaldehyde for 3 minutes or 1 per cent for 10 minutes as the spores of all these species resists this treatment while the vegetative forms do not.—*C. W. Dodge.*

1599. Mast S. O. **Reversion in orientation to light in the colonial forms, Volvox globator and Pandorina morum.** Jour. Exp. Zool. **27**: 367–390. 1919.—(1) *Volvox* and *Pandorina* are usually positive in weak, and negative in strong light if they are dark-adapted; but if they are light-adapted the opposite sometimes holds. (2) If dark-adapted colonies are exposed in constant illumination, they are neutral at first, then they become positive, later negative, and finally positive again. The higher the illumination the shorter the time required to pass through these stages, but in the higher illuminations it requires much more energy to induce the changes in orientation, than it does in the lower illuminations. (3) Reversion is, to a certain extent, dependent upon the amount of energy received, but under certain conditions it appears to be dependent primarily upon the time-rate of change in illumination. (4) Reversion is not controlled by photosynthesis. Red and yellow lights in which photosynthesis is relatively strong have little effect on reversion, while green and blue in which photosynthesis is relatively weak are nearly as effective as white light. (5) The rays which have the greatest stimulating efficiency (green and blue) are the most potent in producing reversion. (6) The sense of orientation is dependent upon the physiological state of the colonies as well as upon the constitution of the culture medium. It is also dependent upon the age of the colonies. Young colonies are more likely to be negative than old ones. (7) Reversion is probably associated with changes in permeability.—*S. O. Mast.*

1600. Mast, S. O. **Effect of chemicals on reversion in orientation to light in the colonial form, Spondylomorum quaternarium.** Jour. Exp. Zoöl. **26**: 503–520. 1918.—(1) Acids and some narcotics, especially chloroform, when added to the culture solution, cause negative specimens of *Spondylomorum* to become strongly positive. They have no effect on positive specimens except perhaps to make them more strongly positive. Only a few of the numerous other substances tested have any effect, and these produce only a very slight tendency toward positive orientation. (2) Increase in the concentration of the culture solution, produced by adding culture solution part of which has evaporated, or to which sodium hydrate has been added, causes positive colonies to become strongly negative. Decrease in concentration, produced by adding a less concentrated culture solution, causes negative colonies to become strongly positive. A decrease, produced by adding pure water, has only a very slight effect,

if any. (3) The sense of orientation is not specifically related to the concentration of chemicals in the environment. *Spondylomorum* probably may be either negative or positive in any solution in which it orients at all. The effect of acids on the sense of orientation is probably due to the reduction of hydroxyl ions produced in the culture solution by the acids. (5) Reduction in the concentration of hydroxyl ions, increase in anesthetics, increase in temperature, and decrease in light, produce the same change in the sense of orientation, and this may also occur without any change in the environment. It is, therefore, probably due to some specific change in the physiological process in the organism, which may be induced by a number of different factors. (6) Reversion depends upon the time-rate as well as upon the magnitude of change in the concentration or intensity of the effective factors in the environment.—*S. O. Mast.*

1601. Schanz, Fritz. **Einfluss des Lichtes auf die Gestaltung der Vegetation. [The influence of light on vegetation.]** Ber. Deutsch. Bot. Ges. 36: 619–632. 1918.—*Leontopodium alpinum*, the Swiss Edelweiss, when grown at low altitudes loses its dwarf characteristics and develops into a tall plant. Artificial elimination of the ultra-violet rays produces similar effects not only on Edelweiss but also on plants like begonia, lobelia and potato. It appears then that the ultra-violet light retards growth and inhibits elongation and that, broadly speaking, the rays of short wave length are the determining factor in the height development of the vegetation.—*Ernst Artschwager.*

1602. Shull, C. A. **Photometry.** [Rev. of: Ridgway, Charles S. **A promising chemical photometer for plant physiological research.** Plant World 21: 234–240. 1918 (See Bot. Absts. 3, Entry 2910).] Bot. Gaz. 68: 71. 1919. "If the instruments and methods of using the solution can be reliably standardized, the inexpensiveness of the materials, ease of taking readings, accuracy of determinations, and its automatic integration for variable conditions of light will make it an excellent instrument for extending our knowledge of the influence of light as related to life processes."—*Author's summary.*

1603. Sugiura, K., and S. R. Benedict. **The action of radium emanation on the vitamines of yeast.** Jour. Biol. Chem. 39: 421–433. 1919.—Growth-promoting factors in yeast may be inactivated partially by means of exposure to radium emanation.—*G. B. Rigg.*

TOXIC AGENTS

1604. Anonymous. **Prejudicial effects of treatment with formalin upon the germination of seeds.** Sci. Amer. Supplem. 87: 164. 1919.

1605. Clayton, E. E. **Hydrogen cyanide fumigation.** Bot. Gaz. 67: 483–500. *2 fig.* 1919.—Different concentrations of hydrocyanic acid gas gave effects ranging from stimulative to depressive. The maximum of benefit was secured from concentrations deadly to insect life, but just a little below the point of first injury to the plant. Wetting the leaves had a beneficial effect on the tomato. Reduced temperature and low light intensity during the day preceding fumigation increased resistance. Injury closely paralleled the stomatal movement, increasing as the size of stomatal aperture increased. A higher or lower water supply in the soil affected resistance, through hastening or retarding the growth rate. Rapidly growing plants were susceptible to injury, while slow-growing plants were more resistant. High reducing sugar content seemed to be correlated with maximum resistance.—*E. E. Clayton.*

1606. Crocker, William. **Organic plant poisons.** [Rev. of: Brenchley, Winifred E. **Organic plant poisons. I. Hydrocyanic acid. II. Phenols.** Ann. Botany 31: 447–456. 1917. *Ibid.* 32: 259–278. 1918. (See Bot. Absts. 1, Entry 1659).] Bot. Gaz. 67: 182–183. 1919.

1607. Crocker, William. **Effect of illuminating gas on plants.** [Rev. of: Wehmer, C. **Leuchtgaswirkung auf Pflanzen. 4. Die Wirkung des Gases auf das Wurzelsystem von Holzpflanzen; Ursache der Gaswirkung.** Ber. Deutsch. Bot. Ges. 36: 140–144. 1918 (See Bot.

Absts. 2, Entry 614).] Bot. Gaz. 67: 517. 1919.—The reviewer notes that "the author seems to have overlooked most of the literature on the effect of illuminating gas on plants."—*H. C. Cowles.*

1608. Crossley, M. L. **Gentian violet—Its selective bactericidal action.** Jour. Amer. Chem. Soc. 41: 2083–2090. 1919.

1609. Duggar, B. M., and Anne W. Davis. **Seed disinfection for pure culture work: the use of hypochlorites.** Ann. Missouri Bot. Gard. 6: 159–170. 1919.—Seeds were treated both continuously and discontinuously, with commercial chloride of lime, Javel water, sodium hypochlorite, and Dakin's soluble chlorazene, for various intervals of treatment. After "taking into consideration both (1) the capacity of the seed for germination after treatment and (2) the relative freedom from contamination," "chlorinated potassa," or Javel water, is recommended as the most satisfactory agent. The interval of treatment required for certain seed is 3 hours or more with concentrations of 10 to 20 per cent. Intermittent disinfection is fully warranted in some cases, but the value of soaking the seed before long period treatment is questioned, although a preliminary washing of all seed is advisable.—*S. M. Zeller.*

1610. McHargue, J. S. **The effect of manganese on the growth of wheat; a source of manganese for agricultural purposes.** Jour. Indust. Eng. Chem. 11: 332–353. 1919.—Manganese in suitable dilution stimulates the growth of wheat, increases the size and nitrogen content of the grain, and evidently performs an important function in the normal growth and development of the plant.—*H. Schmitz.*

1611. Steinberg, Robert Aaron. **A study of some factors in the chemical stimulation of the growth of Aspergillus niger.** Amer. Jour. Bot. 6: 330–372. *Fig. 1–2.* 1919.—*Aspergillus niger* was grown in flasks in Pfeffer's solution, which was modified by changing its acidity, or altering the concentration of the components; or purified by autoclaving with calcium carbonate to remove traces of iron and zinc. The dry weight of mycelium produced in seven days is taken as the yield. Increased acidity of the solution produces an increase in yield and a decrease in the amount of sporulation,—effects similar to those observed upon adding salts of heavy metals, especially iron and zinc. Since the stimulating salts all undergo partial hydrolysis in water, thereby increasing the acidity of the solution, it is possible that the phenomenon is the same in both cases. In purified Pfeffer's solution, practically no growth occurs; slight stimulation results from the addition of either iron or zinc, but both must be present to produce the maximum effect. Stimulation formerly thought to be due to zinc alone is doubtless. the effect of both zinc and iron, the latter having been present as an impurity.—*G. S. Torrey.*

1612. Steinkoenig, L. A. **Relation of fluorine in soils, plants, and animals.** Jour. Indust. Eng. Chem. 11: 463–465. 1919.—See Bot. Absts. 4, Entries 1636, 2716.

1613. Wehmer, C. **Leuchtgaswirkung auf Pflanzen. [Effect of illuminating gas on plants.]** Ber. Deutsch. Bot. Ges. 36: 460–464. 1918.—If the roots of young trees are exposed to the gas in late fall, the injury resulting manifests itself in the loss of the foliage of the tree. Later exposures show no direct effect. However, the following spring the treated trees die. The poisoning principle of the gas is hydrogen cyanide which is always present in small quantities. Whenever the HCN was removed by passing the gas through suitable wash bottles, no injury resulted, or the effect was markedly decreased.—*Ernst Artschwager.*

1614. Wyeth, F. J. S. **The effects of acids, alkalies, and sugars on the growth and indole formation of Bacillus coli.** Biochem. Jour. 13: 10–24. 1919.—*Bacillus coli* was grown on 2 per cent peptone media, the optimum H-ion concentration of which was found to lie between P_H 4.27 and 9.87. A change in the initial reaction results in a change in the same direction but of less magnitude in the final reaction of the culture. Data on these changes are given. It is noted the formation of indole is retarded by free alkali or acid,—likewise certain sugars cause the same effect by inhibiting the activity of the proteolytic enzymes. Thus 2 per cent glucose to peptone media completely inhibits indole formation, 2 per cent lactose or maltose

almost completely, the same percentage of saccharose or mannite but partially inhibits, and starch has no effect.—*A. R. Davis.*

1615. Young, H. C. **Seed disinfection for pure culture work.** Ann. Missouri Bot. Gard. 6: 147–158. 1919.—Seeds of various vegetables and cereals were disinfected with calcium hypochlorite, formalin, and mercuric chloride, after preliminary treatment with water, 70 per cent alcohol, or hydrogen peroxide, for various periods of treatment. The results indicate the need of choosing a specific disinfectant and method of treatment for the kind of seed to be sterilized.—*S. M. Zeller.*

ELECTRICITY AND MECHANICAL AGENTS

1616. Mercier, C. A. **The electrification of seeds.** Sci. Amer. 120: 142–143. *6 fig.* 1919.—See Bot. Absts. 4, Entry 104.

"PHYSIOLOGICAL" DISEASES

1617. Brooks, Charles, J. S. Cooley, and D. F. Fisher. **Nature and control of apple scald.** Jour. Agric. Res. 18: 211–240. 1919.—Scald is typically a skin disease of the apple in storage. Only 5 or 6 surface layers of cells are affected, except under long continued unfavorable conditions, when the tissue may become dead, brown, and rot-like to a depth of 1 cm. or even to the core. Well-colored red fruit is practically immune to scald. Losses from scald are greater than from all other transportation and storage diseases of the apple and in addition the trouble introduces uncertainty and misunderstanding in marketing.—The humidity of the storage house does not play a part in the development of scald nor does reduced or increased supply of oxygen, nor ozonated air. Carbon dioxid accumulation does not increase scald and prestorage treatment with this gas for 2 to 6 days reduces the amount of scald development later.—Scald has been produced artificially by subjecting fruits to vapors of ethyl acetate, amyl acetate, and methyl butyrate.—Various esters are formed in the ripening fruit and circulation of air helps to remove these promptly. A large number of fats and oils, which are known to absorb these esters, were tested by impregnating the wrapping paper with them. Many of such treatments proved effective in eliminating or greatly reducing scald. Previously unexplained thermal relations of scald are attributed to greater chemical activity at higher temperatures.—In general, mature fruit scalds less than immature, but fruit just changing from green to yellow scalds worse than either.—Scald is worse on fruit trees receiving heavy irrigation than on those receiving light.—Stirring of storage air is more important than its renewal in preventing scald. Boxed apples exposed to a continuous air current of 0.88 mile per hour have been practically free from scald while similar apples that did not receive the constant fanning became badly scalded.—Apples in ventilated barrels developed less than one-third as much scald as those in commercial barrels when both were held in a storage room that received occasional ventilation; but where the storage room received little or no ventilation the ventilated barrels showed little decrease in the amount of scald.—*D. Reddick.*

MISCELLANEOUS

1618. Anonymous. **Botrytis.** Kew Bull. Misc. Inf. [London] 1919: 93. 1919.

1619. Anonymous. **The dendrograph.** Sci. Amer. 120: 365. 1919.—See Bot. Absts. 4, Entry 392.

1620. Arisz, W. H. **De structuur van het melksapvaatstelsel bij Hevea. [The structure of the lacticiferous vessel system of Hevea.]** Arch. Rubbercult. Nederlandsch-Indië 3: 139–155. 1919.—See Bot. Absts. 3, Entry 2410.

1621. Barthel, Chr. **Försök med Dr. A. Kühns U-culturer. [Tests of Dr. A. Kühns' U-cultures.]** K. Landbr. Akad. Handl. och Tidskr. 1919: 85–95. 1919.—See Bot. Absts. 4, Entry 1641.

1622. Ewart, A. J. **The cause of bitter rot.** Proc. Roy. Soc. Victoria (N. S.) 30[1]: 15–20. 1917. [Received in 1919.]—See Bot. Absts. 4, Entry 1281.

1623. Legg, Albert Tom. **The preparation of silica jelly for use as a bacteriological medium.** Biochem. Jour. 13: 107–110. 1919.—An attempt is made to standardize the preparation of silica jelly so as to obtain uniform results. A clear and detailed description is given of the preparation of collodion membranes and of each step in the subsequent procedure in the formation of a uniform jelly. The critical factors pointed out are: (1) The use of a membrane of standard permeability, (2) a sufficiently long period for the sodium silicate and HCl to react after mixing, and (3) tubing the medium as quickly as possible after removal from the membrane and immediate autoclaving.—*A. R. Davis.*

1624. Osborne, W. A. **A contribution to the theory of gel structure.** Proc. Roy. Soc. Victoria (N. S.) 30: 153–158. 1918. [Received 1919.] (Contains papers read Sept. to Dec., 1917.)

1625. Rands, R. D. **De bruine binnenbastziekte van Hevea Brasiliensis (Voorloopige mededeeling.) [The brown bast disease of Hevea Brasiliensis.]** Arch. Rubbercult. Nederlandsch-Indië 3: 156–159. 1919.—See Bot. Absts. 3, Entry 2732.

1626. Schultz, T. S., Donald Folsom, F. Merrill Hildebrandt, and Lon A. Hawkins. **Investigations on the mosaic disease of the Irish potato.** Jour. Agric. Res. 17: 247–273. *Pl. A, B,* and *25–30.* 1919.—See Bot. Absts. 3, Entry 2755.

1627. Simmons, J. E. **A comparison, with the standard plate methods, of some rapid methods for bacteriologic analysis of milk.** Jour. Infect. Diseases 24: 322–336. 1919.—A large number of milks, varying in bacterial count from 50–160,000,000 per cc. were analyzed by 5 different methods: direct microscopic, standard plate, lactose plate, little plate (Frost) and reduction test. When the bacterial content of a milk was low (less than a million), all of the methods used gave satisfactory results, except the direct microsopic count; when the bacterial content of the milk was high, the direct microscopic method for the reduction test served best. The little plate furnished results in one-eighth to one-fifth of the time required by the other culture methods.—*Selman A. Waksman.*

1628. Talbot, H. W. **Definition of peat.** Jour. Amer. Peat Soc. 12: 212. 1919.—See Bot. Absts. 4, Entry 1687.

1629. Van Slyke, H. D., and H. A. Salvesen. **The determination of carbon monoxide in blood.** Jour. Biol. Chem. 40: 103–107. 1919.

SOIL SCIENCE

J. J. Skinner, *Editor*

F. M. Schertz, *Assistant Editor*

GENERAL

1630. Allen, E. R., and B. S. Davisson. **An all-glass nitrogen apparatus.** Ann. Missouri Bot. Gard. 6: 45–48. *Pl. 2.* 1919.—See Bot. Absts. 4, Entry 1486.

1631. Burd, John S. **Rate of adsorption of soil constituents at successive stages of plant growth.** Jour. Agric. Res. 18: 51–72. *Fig. 1–13.* 1919.—See Bot. Absts. 4, Entry 1420.

1632. Carr, R. H. **Vegetative growth in soils containing crude petroleum.** Soil Sci. 7: 67–68. 1919.—Crude oil in amounts up to 27,000 pounds per acre has but little effect on the growth of soy beans in the soil tested. Larger amounts decreased the growth. The smaller amounts apparently favored nodule production and up to 72,000 pounds per acre did not com-

pletely inhibit it. The damage seems to be due to the inability of the plant to secure water with sufficient rapidity.—*William J. Robbins.*

1633. Hesselman, Henrik. **Studier över de norrländska tallhedarnas föryngringsvillkor. II. [Studies of natural reproduction in the pine heaths of Norrland.]** Skogsvårdsföreningens Tidskr. 17: 29-76. *Fig. 1-16.* 1919.

1634. Parker, R. C. **Testing seed potatoes on Long Island.** Potato Mag. 2^3: 8, 22-23; 2^4: 19, 27-28. *1 fig.* 1919.—See Bot. Absts. 3, Entry 2721.

1635. Sim, T. R. **Soil erosion and conservation.** South African Jour. Indust. 2: 1034-1042. 1919.—Within or in the vicinity of undamaged forest, erosion is rare. It is not usually the root mass which holds the soil, but the surface sponge which prevents water from running, or from gaining force if it does run. Certain classes of grass-veld are naturally tending toward the tree veld and should be in trees rather than in grass.—*E. P. Phillips.*

1636. Steinkoenig, L. A. **Relation of fluorine in soils, plants, and animals.** Jour. Indust. Eng. Chem. 11: 463-465. 1919.—The percentage of fluorine in plants seldom rises above 0.002 per cent and most times it is below 0.001 per cent. [See also Bot. Absts. 4, Entry 2716.]—*H. Schmitz.*

1637. Swanson, C. O., and W. L. Latshaw. **Effect of alfalfa on the fertility elements of the soil in comparison with grain crops.** Soil Sci. 8: 1-39. 1919.—Analyses are reported for the nitrogen, phosphorus, calcium, and organic and inorganic carbon of the soil from old alfalfa fields, old cultivated fields and virgin sod wherever they could be found in close proximity. About 40 comparisons involving approximately 100 soils were made. In the humid and sub-humid sections of Kansas the alfalfa fields contained less nitrogen than the virgin sod but more than the cropped fields. In the semi-arid section the alfalfa fields contained more nitrogen than the virgin sod. The cropped fields contained less than the sod. In all three sections the alfalfa fields contain less organic carbon than the sod but more than the cropped fields. The phosphorus content of cropped soil was less than that in alfalfa or sod.—*William J. Robbins.*

1638. Walker, S. S. **The use of nickel crucibles for the J. Larence Smith fusion in determining soil potassium.** Jour. Indust. Eng. Chem. 11: 1139-1140. 1919.—It is found that the same results for soil potassium are obtained whether the soil is fused in a platinum or nickel crucible, but that the nickel crucibles are attacked by the fusion mixture and are therefore not as satisfactory.—*Henry Schmitz.*

1639. Walster, H. L. **Soil conditions and plant growth.** [Rev. of: Russell, E. J. **Soil conditions and plant growth.** 3d ed. *243 p., 14 fig.* Longmans, Green and Co.: New York, 1917.] Bot. Gaz. 67: 171-173. Feb., 1919.

INFLUENCE OF BIOLOGICAL AGENTS

1640. Allen, E. R. **Some conditions affecting the growth and activities of Azotobacter chroococcum.** Ann. Missouri Bot. Gard. 6: 1-44. *Fig. 1-2.* 1919.—See Bot. Absts. 4, Entry 1532.

1641. Barthel, Chr. **Försök med Dr. A. Kühns U-culturer. [Tests of Dr. A. Kühns' U-cultures.]** K. Landbr. Akad. Handl. och Tidskr. 1919: 85-95. 1919.—A review of work on soil inoculation with cultures of free-living, nitrogen fixing bacteria and a presentation of bacteriological and cultural investigations with a "universal-culture" put out by Dr. A. Kühn of Berlin. U-cultures contain a mixed bacterial flora similar to that found in ordinary soil. No beneficial effect was found from its use in tests with oats, potatoes, and cabbage. Substantiates the belief of soil bacteriologists that, aside from the specific nodule bacteria of legumes, introduction of nitrogen fixing bacteria into normal soils is ineffective since these

organisms are normally present and can be rendered more effective only by making the soil more favorable for their growth and activity.—*E. G. Anderson.*

1642. Briscoe, Charles F., and H. H. Harned. **Bacteriological effects of green manure. Study No. 11.** Mississippi Agric. Exp. Sta. Bull. 185: *8 fig.* 1919.—See Bot. Absts. 4, Entry 36.

1643. Conn, H. J., and J. W. Bright. **Ammonification of manure in soil.** New York Agric. Exp. Sta. [Geneva] Tech. Bull. 67: 3–45. 1919.—A reprint of article in Jour. Agric. Res. 16: 313–350. 1919. [See Bot. Absts. 3, Entry 850.]

1644. Fred, E. B., W. H. Peterson, and A. Davenport. **Acid fermentation of xylose.** Jour. Biol. Chem. 39: 347–384. *Pl. 1.* 1919.

1645. Fred, E. B., and E. J. Graul. **Effect of inoculation and lime on the yield and on the amount of nitrogen in soy beans on acid soil.** Soil Sci. 7: 455–467. *Fig. 1.* 1919.—In pot and field experiments on sandy soils inoculation increased the yield of dry matter of soy beans which was further increased by the application of lime. On the silt loam used inoculation did not increase the yield but increased the per cent of protein in the crop. In a pot experiment in which the soil and crop were analyzed 323.5 pounds of the nitrogen in the plant on an acre basis came from the air and 130.4 pounds of nitrogen from the soil inoculated but unlimed. When limed and inoculated 389.0 pounds of nitrogen came from the air and 122.7 pounds from the soil.—*William J. Robbins.*

1646. Noyes, H. A. **Accurate determination of soil nitrates by phenol disulfonic acid method.** Jour. Indust. Eng. Chem. 11: 213–218. 1919.—Investigations to overcome the errors in the colorimetric (phenol disulfonic acid) method to determine soil nitrates are reported. The method is adapted to the accurate determination of soil nitrates in large as well as in small amounts.—*H. Schmitz.*

1647. Robbins, William J., and E. C. Lathrop. **The oxidation of vanillin to vanillic acid by certain soil bacteria.** Soil Sci. 7: 475–485. *Fig. 1.* 1919.—Vanillic acid was isolated from solution cultures containing nutrient mineral salts and vanillin and inoculated with a pure culture of a soil bacterium. In solution cultures vanillin is rapidly oxidized to vanillic acid by this bacterium. The vanillic acid at first accumulates in the culture solution but is later destroyed.—*William J. Robbins.*

1648. Vass, A. F. **The influence of low temperature on soil bacteria.** Cornell Univ. Agric. Exp. Sta. Mem. 27: 1039–1074. 1919.—The freezing of soils containing bacteria results in an increase in the bacterial count as determined by the agar-plate method. The author concludes that this is due to the fact that freezing and thawing results in breaking up the clumps of bacteria and not to any actual increase in the number of bacteria. The fact that freezing in salt and ice at −15°C., or in liquid air at −190°C. for short periods, ranging from one minute to two hours, may result in increasing the bacterial count more than 100 per cent is given as proof that no bacterial growth occurs. The temperature of the water used in making the dilution and the rate of thawing seem also to have a marked effect on the bacterial count from samples of frozen soil, an increase in number accompanying an increase in temperature of the water up to about 30°C. When pure cultures of the non-spore-producing *Bacillus radicicola* were frozen in nutrient solutions in sand, in soil, and in solutions containing different concentrations of glycerin or glucose it was found that the presence of sand, soil or solutes offered considerable protection against the destructive effect of the freezing, and the higher the concentrations of the solutes, the greater was the protection. [See Bot. Absts. 4, Entry 1592.]—*Otis F. Curtis.*

SOIL ACIDITY

1649. Conner, S. D., and H. A. Noyes. **Natural carbonates of calcium and magnesium in relation to the chemical composition, bacterial content and crop-producing power of two very acid soils.** Jour. Agric. Res. 18: 119–125. *Pl. 1–2.* 1919.—Pot cultures were used. The

crops grown were wheat, red clover, and blood turnip beets. The two soils used were an acid silty clay, low in organic matter, and an acid black peaty sand high in organic matter.—When 4000 pounds of calcite, magnesite and dolomite were applied to both soils the results were similar. The differences between the calcite, magnesite, and dolomite increases were small for the wheat and clover, while magnesium carbonate gave much larger increases with the beets. With a 12,000-pound application, magnesite caused injury on the black soil but an increase in crop yield on clay soil. Although the magnesite caused as much wheat increase in all, except the 12,000-pound magnesite application on the black sand, there was at times during vegetative growth a tendency toward tip burning wherever magnesite was applied. Magnesite favored nitrification more than calcite. On the yellow clay soil, magnesite also favored better growth of aerobic and anaerobic bacteria than did calcite. On the black sand soil the reverse was true.—*J. M. Brannon.*

1650. Crocker, William. **Soil acidity.** [Rev. of: Hartwell, B. L., and F. R. Pember. **The presence of aluminum as a reason for the difference in the effect of the so-called acid soil on barley and rye.** Soil Sci. 6: 259-279. *1 pl. 2 fig.* 1918 (See Bot. Absts. 2, Entry 1137).] Bot. Gaz. 67: 519-1919.—The reviewer notes that this paper shows the complexity of the apparently simple problem of soil acidity, and adds that he has noticed that "the hydrogen ion concentration found in acid soils by the gas chain method is generally only a fraction of the hydrogen ion concentration necessary to reduce the growth rate of plants in water or sand cultures."—*H. C. Cowles.*

1651. Funchess, M. J. **Acid soils and the toxicity of manganese.** Soil Sci. 7: 69. 1919.—Previously (Alabama Agric. Exp. Sta. Bull. 201) the author concluded that the toxicity to plants of certain plots on the Alabama Agric. Exp. Sta. farm was due to soluble manganese produced by the action of nitrogenous fertilizers. Further studies indicate that the toxicity observed in these soils after incubation with a nitrogenous fertilizer and in their extracts is probably due to uncombined acid or readily hydrolyzable salts but not to manganese.—*W. J. Robbins.*

1652. Hill, H. H. **A comparison of methods for determining soil acidity and a study of the effects of green manures on soil acidity.** Virginia Agric. Exp. Sta. Tech. Bull. 19. *25 p.* 1919.—The author points out that as a rule Virginia soils are very deficient in organic matter and that this deficiency may be overcome by the practice of green manuring. The ash of plants is alkaline and on decomposition exerts a marked influence in correcting soil acidity resulting from the incorporation of green crops with the soil. Plants remove calcium from the soil. Legumes remove more than non-legumes. The young plants contain slightly more lime than the mature ones. In turning under crops the calcium in the plant is returned to the soil thereby exerting a certain effect in correcting soil acidity. The method of Veitch in estimating soil acidity, though quite reliable, is long and tedious. The Jones method is rapid and on comparison with the Veitch, fairly concordant results are obtained and applications of lime by its use have approached very near the actual field conditions. The Jones method differentiates applications of phosphoric acid on plats which have produced corn over long periods. This distinction is very clear-cut. In pot experiments, with the leading types of Virginia soils, the incorporation or plant tissue produced a very slight increase in soil acidity. This, however, was not excessive. In pot experiments, green manures did not inhibit a vigorous nitrate development and plant growth was materially increased. In field experiments with soybeans, buckwheat, red clover and rye, with corn and wheat, no marked acidity was developed during a five-year period. The turning under of the green manure crops was not detrimental to a strong nitrate production, nitrogen fixation and plant growth. With field experiments where the green crops were turned under at intervals of two weeks throughout their development, no injurious effects were observed as a result of this practice and after the second crop had been turned under the lime requirement of the soil was diminished rather than increased. Rye shows a decided initial acidity but this condition quickly passes off. The indications are that this initial acidity is not of serious harm to the plant on account of its transitory nature. The common belief that a green manure practice is a harmful one, is not

substantiated by the results obtained. From the results obtained on soils receiving green manures the general tendency is toward the creation of an alkaline condition in the soil, rather than an acid one. In a well-planned rotation, taking into consideration the loss of bases in the drainage water and the restoration of these bases by means of moderate applications of lime, at regular intervals, little, if any, harm should result from the turning under of green crops as a means of replenishing the store of organic matter in the soil.—*H. H. Hill.*

1653. Hoagland, D. R. **Relation of the concentration and reaction of the nutrient medium to the growth and absorption of the plant.** Jour. Agric. Res. 18: 73–117. *Fig. 1–4.* 1919.—See Bot. Absts. 4, Entry 1424.

1654. Hoagland, D. R., and A. W. Christie. **The effect of several types of irrigation water on the P_H value and freezing point depression of various types of soils.** Univ. California Publ. Agric. Sci. 4: 141–157. 1919.—The effects of artificially prepared "alkali" waters upon some physico-chemical properties of seven distinct types of soils was determined. Methods of investigation included electrometric determinations of the OH ion concentration, freezing point determination of total concentration of the soil solution, and chemical analysis of water extracts of the soils. The analyses were calculated in terms of the characteristic groups as proposed by the United States Geological Survey. Their reaction values are obtained from the expression $\frac{V}{W}$ C, where V = valence of the ion, W = the atomic weight, and C = concentration in parts per million. The characteristic groups represent the percentage properties of the water and are independent of concentration. Different waters may thus be classified readily irrespective of total concentration.—The soil must be considered as a chemical system in which the effect of any added water will be modified by the chemical and physical reactions in the soil. Consequently it is not sufficient to calculate the amount of sodium salts added to an acre of soil by a given number of inches of irrigation water.—It is not possible to compute the extent to which a given quantity of salt will increase the depression of the freezing point in a soil of optimum moisture content unless account is taken of the free and unfree water.—Waters with a high percentage of primary alkalinity applied in moderate quantities to soils produced greatly increased OH ion concentrations, especially in light sandy soils.—Waters with high concentrations of alkali salts soon produced excessive concentration of the soil solution.—Any appreciable increases in OH ion concentration of the soil (especially when exceeding Ph 8.5) appear to be injurious to seedlings.—The determination of the OH ion concentration and freezing point depression of soils may be more practical and useful as a basis of interpretation than the procedures hitherto used in analyzing alkali soils.—*H. S. Reed.*

1655. MacIntire, Walter Hoge. **The carbonation of burnt lime in soils.** Soil Sci. 7: 325–453. *Pl. 1–4, fig. 1–11.* 1919.—Extensive studies in vitro and in soil show that calcium oxide and calcium hydroxide in 2–4-ton applications will revert to the carbonate if left on the soil surface for several days prior to inworking. This reversion will occur more rapidly during humid atmospheric conditions. Less rapid carbonation occurs when the oxide or hydrate is mixed with the soil. Neither the oxide nor hydrate can be considered chemically destructive of soil organic matter when used in the amounts and in the manner considered as practical applications. If the oxide or hydrate is incorporated within the upper zone of the soil, prior to a more thorough dissemination throughout the soil the concentration thus affected will bring about in the treated zone a temporary or partial sterilization.—*William J. Robbins.*

1656. Noyes, H. A. **Soil acidity—the resultant of chemical phenomena.** Jour. Indust. Eng. Chem. 11: 1040–1049. 1919.—The reaction of a soil at any time is dependent both on the nature and the proportions in which its constituents are present with water. Changing the water content, removing substances from solution, and the addition of other substances change the reaction in accord with the working of the law of mass action. The solubilities of substances, the possibilities of combination, and the rate at which reactions take place in soil

vary so that the condition of a soil at any time can be considered but a stage in its progress toward a constantly shifting equilibrium in accordance with the principle of Le Clatelier.—*Henry Schmitz.*

1657. Rabaté, E. **Recherches sur la réaction des terres. [The reaction of soils.]** Compt. Rend. Acad. Agric. France 5: 854–858. 1919.—Discusses methods of demonstrating alkalinity or acidity of soils and the cultural practices to be followed in consequence.—*E. A. Bessey.*

1658. Stephenson, R. E. **Activity of soil acids.** Soil Sci. 8: 41–59. 1919.—Soil acids capable of giving a toxic hydrogen ion concentration react rather quickly (2 weeks in the experiment reported) with calcium carbonate but soils may contain a large reserve of acidity which is capable of decomposing calcium carbonate slowly for a considerable period of time (21 weeks in the experiment noted).—*William J. Robbins.*

1659. Truog, Emil, and M. R. Meacham. **Soil acidity: II. Its relation to the acidity of the plant juices.** Soil Sci. 7: 469–474. 1919.—The hydrogen ion concentration of juice pressed from plants grown in strongly acid soils is generally greater than that of the juice of plants grown on the same soil limed. Lupines were an exception. The juice of plants cut in the morning is more acid than that of plants cut in the afternoon. A difference between the acidity of the juice of tops and roots of the same plant is noted.—*William J. Robbins.*

FERTILIZATION

1660. Cruickshank, Robert B. **Orchard fertilization.** Trans. Indiana Hortic. Soc. 1918: 121–137. *1 pl., 3 fig.* 1919.—See Bot. Absts. 4, Entry 915.

1661. Hartwell, Burt L. **The manurial value of a modification of orthoclase-bearing rock where only potassium was deficient.** Jour. Amer. Soc. Agron. 2: 326–329. 1919.—The paper reports the results of an inextensive field trial conducted at the Rhode Island station during six years.—*F. M. Schertz.*

1662. Hedrick, U. P., and R. D. Anthony. **Twenty years of fertilizers in an apple orchard.** New York Agric. Exp. Sta. [Geneva] Bull. 460: 71–96. *Fig. 1.* 1919.—See Bot. Absts. 4, Entry 931.

1663. Johnson, M. O. **[Soil investigations.]** Hawaii Agric. Exp. Sta. Rept. 1918: 23–26. *Pl. 5.* 1919.—A rapid approximate method of determining the lime requirements of Hawaiian soils as developed at this station is referred to. Fertilizer experiments with rice, bananas, and pineapples are reported, with special attention given to the application of iron sulphate in the form of spray to overcome the deleterious effect of abnormal quantities of manganese in pineapple fields. Burnt lime has proved partially effective in controlling pineapple wilt but can not be considered entirely successful.—*J. M. Westgate.*

1664. Iversen, Karsten. **Lokale Forsog med Kunstgodning til Korn og Rodfrugt. Vdforte paa Fyn i darene 1901–1915. [Local experiments with fertilizers for cereals and root crops. Performed in Fyn in the years 1901–1915.]** Tidsskr. Landbrug. Planteavl 26: 193–297. 1919.—The objects of the experiments were to determine (1) the fertilizer needs of the soil in each locality and (2) the effects of fertilizers on various crops under varying conditions.—Similar plans were used for each set of experiments, which were performed on 4 to 8 replicate plots. Differences between crops on fertilized and unfertilized plots were noted on the following number of experiments; 126 with barley, 49 with oats, 191 with mangolds, 41 with sugar beets. Stable manure was used in the experiments with mangolds and sugar beets, but not with oats and barley.—It was found that the effect of sodium nitrate, superphosphate and potassium is greater when used three together than when used singly or in pairs. The needs of the crop for fertilizer depended largely on the chemical composition of the crops, as determined by the average analysis for the four species.—The assimilation of the fertilizer and the effect of

climatic conditions on the utilization of artificial fertilizers are discussed. It was found that the climatic conditions having a stimulating effect on the size of barley and oat crops, likewise favored the utilization of the artificial fertilizers. Cold dry summers seemed to favor barley grain and cold wet summers favored oats. In the case of mangolds and sugar beets (where stable manure was used in addition to the artificial fertilizers) it was found that the climatic conditions favorable to the size of the crop were usually unfavorable to the utilization of the artificial fertilizers. Hot summers being favorable to the root crops, the heat likewise favored the decomposition of the stable manure, hence there was less need for the nourishment contained in the artificial fertilizers. Artificial fertilizers are more economically applied to the root crops during cold, wet summers rather than during warm, dry summers.—When commercial fertilizers were used separately, it was found that potassium gave the best average results in warm, dry summers and phosphates in cold, wet summers.—The results were studied in reference to the relation between the productive capacity of the soil and the size of the excess crop when using artificial fertilizers.—*Albert A. Hansen.*

1665. Jones, C. Bryner. **The breaking up of permanent grass in 1918.** Jour. Roy. Agric. Soc. England 79: 24–44. 1918.—A general discussion of the crop results and soil treatments of the permanent grass land of England which were planted in cultivated crops during the war. The success of the crops on the heavier types of soil is a question of tilth, which is influenced largely by the time of plowing. The applying of lime and suitable fertilizers, principally phosphates, contributed materially to the success of the crop.—*J. J. Skinner.*

1666. Kristensen, R. K. **Konservering af Ajle. [Preservation of liquid manure.]** Tidsskr. Landbrug. Planteavl 26: 485–490. 1919.—Experiments in the laboratory of the State Experiment Station at Askov on the preservation of liquid manure attempted by the addition of sulphuric acid and superphosphate. An analysis of the liquid manure showed 0.478 per cent nitrogen and 0.418 per cent nitrogen in ammonia. The preservatives were added and the manure placed in a water bath and vaporized. It was found that two-thirds of the acid is bound by ammonia, and one-third by other bases. Absolutely no effect on the loss of ammonia was observed by the addition of small amounts of acid. In order to bind all the ammonia contained in 5 cm. of manure, 1.3 grams of superphosphate, containing 18 per cent P_2O_5, was necessary.—*Albert A. Hansen.*

1667. Mosséri, Victor M. **Note sur les dépôts nilotiques des Gazayer et Saouahel d'Egypte. [Note on the deposits of the Nile of the "Gazayer" and "Saouahel."]** Bull. Union des Agric. Egypte 17: 49–78. 1919.—See Bot. Absts. 4, Entry 109.

1668. Ramsay, J. T. **Manuring for profit. Results of experiments in potato cultivation.** Jour. Dept. Agric. Victoria 17: 471–475. *Fig. 2.* 1919.—Experiments with fertilizers on potatoes growing on a dark sandy soil gave best results with 600 pounds per acre of bone and superphosphate and 100 pounds of ammonium sulphate.—*J. J. Skinner.*

1669. Rossem, C. van. **Bemestingsproeven in den proeftuin. Verslag over het jaar 1918, tevens samenvatting van de resultaten met die der voorafgaande jaren. (Fertilizer experiments and report for 1918 together with a summary of the results of previous years.)** Mededeel. Algem. Proefsta. Landb. Dept. Landb., Nijverheid en Handel, [Buitzenorg] 2: 1–40. 1919.—Extensive comparisons are made of various artificial manures with regard to their effect on the production of rice. In six tests calcium nitrate had about the same effect as ammonium sulphate while both were more favorable than Chili saltpeter. Sulphuric acid appeared to have no influence on rice production. Calcium carbonate increased the yield. Chili saltpeter and ammonium sulphate were compared in production of cassave and the results showed that the former used singly or in combination with superphosphate gave the highest yields.—*R. D. Rands.*

1670. Russell, G. A. **The effect of fertilizers on the composition of hops.** Jour. Indust. Eng. Chem. 11: 218–224. 1919.—See Bot. Absts. 4, Entry 122.

1671. WAITH, F. G., AND MAUNG PO SHIN. **The phosphate requirement of some Lower Burma paddy soils.** Mem. Dept. Agric. India Chem. Ser. 5: 132–155. *Pl. 1–3.* 1919.—Fertilizer experiments in pots on a number of soils from different parts of Lower Burma, India, were made to determine the effect of phosphoric acid and nitrogen separately and combined. Increased growth was produced from both acid phosphate and ammonium sulphate used singly. The increase was much longer when the two were used together. Each of the soils responded well to the treatment. Analyses made of soils from different regions show that those from around Nyaunglebin and Daiku are low in lime, and high in potash and phosphoric acid. The soils of the Hlaing valley along the Prome are high in magnesia, potash, and phosphoric acid but low in lime. From the neighborhood of Taungoo and from the Pequ, Insein, and Hanthawoddy districts the soils are poor in lime, potash, magnesia and phosphoric acid. It is stated that most of these soils are neutral or acid, while the older soils are distinctly acid. A map is given showing the soils of the regions, which are low and those which are high in phosphoric acid. It is concluded that the lack of phosphoric acid is by no means general all over Lower Burma, and that the deficiency is serious only within definite areas. Phosphoric acid fertilization of soils deficient in phosphoric acid cannot increase crop yields without the addition of nitrogen.—*J. J. Skinner.*

1672. WIANCKO, A. T. **Commerical fertilizers for Indiana: What to use.** Purdue Univ. Agric. Exp. Sta. Circ. 92. *7 p.* 1919.—Advice to farmers.—*M. W. Gardner.*

1673. VOELCKER, J. A. **The Woburn Experimental Station of the Royal Agricultural Society of England.** Jour. Roy. Agric. Soc. England 79: 263–284. 1918.—Under the heading of field experiments are reported the 42nd year's results of the fertilizer experiments with the continuous growth of wheat and of barley. The ammonium sulphate plots in both series have failed entirely as in former years. Wherever ammonium sulphate was used whether singly or with other mineral fertilizers the yields are decreased. Where lime has been used the ammonium sulphate has given good yields. The largest yield in the wheat series was secured with mineral fertilizer and sodium nitrate. In the grass experiments largest yields were secured with basic slag and potassium sulphate. Under the head of pot culture experiments are reported the results of work with iron compounds on wheat. The magnetic oxide (Fe_3O_4) has a slightly stimulating influence. Ferrous chloride ($FeCl_2$) has a markedly beneficial effect when not exceeding 0.1 per cent of iron in the soil, it is harmful in larger amounts. Ferric chloride proved decidedly toxic and prevented growth if present to the extent of 0.2 per cent iron in the soil. Experiments are reported to show, the time of applying of ammonium sulphate for best results, the effect of various phosphate and lime materials, no conclusive results were secured.—*J. J. Skinner.*

SOIL CLASSIFICATION

1674. BECK, M. W., AND O. P. GOSSARD. **Soil survey of Mahoning County, Ohio.** Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5–41. *Fig. 1, and map.* 1919.—Mahoning County is drained by the Mahoning River and has a general northward slope. Lying as it does in northeastern Ohio, against the Pennsylvania line, it is entirely within the glaciated region and its soils are either glacial or alluvial in origin.—Youngstown is the county seat and one of the best markets in Ohio. Its population is 125,000 which is four times the rural population of the county. The area is well supplied with railroads. It has a large mileage of improved highways and its dirt roads receive constant attention.—The rainfall averages 38 inches and is evenly distributed. The winters are long but only moderately severe. The summers are not excessively hot.—The upland soils are glacial till and cover 93 per cent of the area. The light glacial material is classified as *Wooster.* Where bed rock occurs at 3 feet or less the series is *Lordstown.* With progressively poorer drainage *Canfield,*—*Volusia* and *Trumbull* series are recognized. Of the thick till overlying the shale of the northern and western part of the county the *Ellsworth* is found in the best drained areas and the *Mahoning* in the poorly drained portions. The terrace and alluvial soils are not of great importance except locally. Some areas of muck occur which are desirable for trucking. In general the soils of the county are productive but need lime, organic matter and drainage.—On

the heavy soils of the *Mahoning* and *Ellsworth* series oats and hay are grown. Corn does not do as well here as upon the *Wooster*, *Canfield* and drained *Volusia*. Corn and potatoes are the important crops on these soils. Oats grow well on almost all the soils of the area. Hay is produced on 50 per cent of the farmed land of the county. General farming, dairying, trucking and orcharding are the principal types of agriculture.—*H. O. Buckman.*

1675. Cobb, W. B., and S. F. Davidson. **Soil survey of Caldwell County, North Carolina.** Advanced sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5 29. *Fig. 1, and map (colored).* 1919.—Caldwell County is situated in the northwestern part of the state. The northern two-thirds lie in the mountainous Appalachian region while the rest consists of the undulating Piedmont plateau. The area is drained by the Catabau and Yadkin Rivers and their tributaries.—The climate is very favorable for agriculture. The growing season is about 6 months in length, with adequate rainfall. The total precipitation is 50 inches. The winters are mild.—Most of the highways are but fair even in summer. Two railroads serve the county. Lenoir is the county seat with a population of 3364. Eighty-four per cent of the county's population is rural.—The soils of the area occur in three provinces, Appalachian Mountain, Piedmont Plateau and River Flood Plain. The Appalachian soils (largely of the *Porters* and *Ashe* series) making up 60 per cent of the county although often productive are not extensively farmed due to their rough topography. The *Cecil* and *Louisa* series dominating in the Piedmont section are good general farming soils capable of being built up into a high state of fertility. The alluvial soils, which comprise 5 per cent of the area, are almost wholly utilized and are in a very high state of productiveness.—General farming predominates with corn as the principal crop. It is grown indiscriminately although it does best on bottom land. Wheat, oats and potatoes are also grown according to the character of the soil.—*H. O. Buckman.*

1676. Kocher, A. E., and A. T. Strahorn. **Soil survey of Benton County, Washington** Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5–72. *Fig. 1 and 2. Plates I, II and III and map (colored).* 1919.—Benton County lies just east of the Cascades on the southern edge of the state. It occupies a peninsula-like position in one of the larger bends of the Columbia, which bounds it on the north, east and south. Drainage is either directly into the Columbia or indirectly thereto by the Yakima River which flows eastward through the center of the area.—The topography of the county ranges from mountains, plain-like plateau and scab lands to high river terraces and recent alluvium, although the latter is much restricted by the gorge character of the master streams.—The climate is arid with a mean precipitation at Kennewick on the Columbia of 6.3 inches. The snowfall varies from a few inches in the valleys to over 2 feet in the mountains, which rise to 3500 feet in places. The mean annual temperature at Kennewick is 54°F., the mean for July being 77°F. and for January 31°F. The growing season is about 170 days in the valleys.—The agriculture is of two types, dry farming and irrigation. The former, which is least important, is carried on upon the upland loess (*Ritzville* series) and valley fill soils (*Sagemoor* and *Burke* series). These soils occupy over one-half of the county. Wheat is the principal crop.—Irrigation is confined exclusively to the valleys due to the difficulty of supplying water to the uplands. Here old high water terraces (*Ephrata* series largely) are of the greatest importance although in places alluvial soils (especially the *Prosser* series) are valuable. The northeastern corner of the county as well as certain southern portions is occupied by sandy wind blown materials of little agricultural value. These deposits cover 21 per cent of the area.—Ninety-five per cent of the people live in the valleys and fruit growing to which the climate and the sandy terrace and alluvial soils are adapted is the principal occupation. Apples, peaches, cherries, pears and grapes are of particular importance especially about Kennewick, Prosser and Richland. Vegetables are a valuable crop together with alfalfa which supports important dairy interests. Hog raising and winter sheep grazing and feeding are also engaged in to a certain extent.—*H. O. Buckman.*

1677. Latimer, W. J. **Soil survey of Barbour and Upshur Counties, West Virginia.** Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. 1917: 5–51. *Fig. 1 and map (colored).* 1919.—The counties in question lie on the markedly eroded portion of the Appalachian

plateau in north central West Virginia. Upland areas predominate with elevations ranging from 1000 to 3000 feet. The area drains westward and southward into the Ohio system.—Railroad facilities are well supplied and the public roads are good despite the rough topography. Small towns and mining camps furnish an opportunity for the local sale of produce while Baltimore and Pittsburgh are the principal large markets.—The climate is healthful and well suited to stock raising and general farming. The mean winter temperature at Philippi in central Barbour County is 32°F. while the summer mean is 70°F. A rainfall of about 48 inches is distributed through the year and proves ample during the growing season.—Over 93 per cent of the soils are residual from the alternating beds of shale, sandstone and limestone of the Carboniferous. Of these soils the *Dekalb* is by far the most prominent although not the most productive. A large percentage of it is either too steep or too stony for cultivation. All of the residual soils need lime. A little over 6 per cent of the area is alluvial and where well drained is very productive. Unclassified rough stony land makes up 8 per cent of the counties.—The population of the area in 1910 was 32,487, the northwest corner of Upshur County being the most thickly settled. Most of the inhabitants of both counties are engaged in agriculture although mining and lumbering receive much attention. The principal crops are hay, corn, wheat, buckwheat and oats. Great areas of hay land and permanent pasture occur. The hay and corn are used largely to feed the horses, hogs and cattle, the sale of the last two being a main source of revenue. Apples, peaches and small fruits are grown on almost every farm but seldom commercially.—*H. O. Buckman.*

1678. Maxson, E. T., and J. H. Bromley. **Soil survey of Saratoga County, New York.** Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. **1917**: 5–42. *Fig. 1, and map* (*colored*). 1919.—Saratoga County lies in eastern New York and occupies the angle formed by the juncture of the Mohawk River with the Hudson. Its topography is varied, ranging from the smooth outwash plains and glacial lake beds of the eastern part to the rough stony spurs of the Adirondacks of the west and north. Most of the agricultural land lies in the former portion, ranging from 200 to 1000 feet in elevation.—Much of the area has good railroad service. Telephone and rural mail delivery extends to every part of the county, while state roads especially in the eastern and southern part facilitate traffic. The local markets are especially good. Troy, Albany, New York and Boston are the leading outside shipping points.—The winters are long and severe with heavy snowfall. The summers are mild and brief. The growing season is 141 days. The precipitation is about 40 inches evenly distributed throughout the year.—Not over 75 per cent of the county is in farms. The main occupation is dairying and general farming. Corn, oats, hay, rye and potatoes are the principal crops. Milk and butter are shipped to outside markets. Vegetables and fruits are grown for local consumption. The natural vegetation of the county is varied and interesting.—The soils are largely of glacial origin, 45 per cent of the county being covered with till (*Gloucester* and *Dutchess* series). Only the latter is of agricultural value and its area is small. Outwash and terrace soils (*Hinkley* and *Merrimac* series) occur over one-third of the area. These soils are sandy and gravelly. They support general and special crops. The heavy glacial like soils (*Vergennes* series) occur in small extent and are utilized for hay and grain. Poorly drained alluvial soils are found along most of the stream. Small areas of muck occur, the largest being near Saratoga Springs. None of the areas are under cultivation.—*H. O. Buckman.*

1679. Mooney, C. N., E. T. Maxson, R. J. Morgan, and J. H. Bromley. **Soil survey of Oswego County, New York.** Advance sheets—field operations Bur. Soils, U. S. Dept. Agric. **1917**: 5–43. *Fig. 1 and map* (*colored*). 1919.—Oswego County lies in the north central part of New York State at the eastern end of Lake Ontario into which it drains. It covers 948 square miles with a topography ranging from rolling to hilly.—Its climate is variable with long snowy winters and short pleasant summers during which few days rise above 95°F. The growing season covers about 190 days.—The soils of the county are largely glacial till (56 per cent) of the *Worth* and *Ontario* series. Both are calcareous, the latter being especially so. The *Worth* stony loam and the *Ontario* loam predominate. They are both adapted to hay, silage corn, oats, beans and fruit. The stonier phase of the former supports prosperous dairy-

ing while most of the commercial orchards occur on the latter.—Sixteen per cent of the county is covered with glacial lake sediment (*Dunkirk* series) while almost as much more is mantled with kame and kettle débris, outwash and delta material and alluvium embracing a number of minor series and types. The sandier phases predominate in these heterogeneous soils and grow excellent beans, silage corn and potatoes. The heavier phases, especially of the *Dunkirk*, are adapted to grass and grain.—Meadow lands of little value cover 6 per cent of the county. Muck of slightly greater extent and of much higher value also exists in scattered areas. Excellent onions, lettuce, celery and beets are raised on this soil.—*H. O. Buckman.*

1680. Winston, R. A., R. W. McClure, H. P. Cooper, and D. C. Wimer. **Soil survey of Clearfield County, Pennsylvania.** Advance sheets—Field operations Bur. Soils, U. S. Dept. Agric. 1916: 5–32. *Fig. 1 and map (colored).* 1919.—Clearfield County is situated entirely within the Alleghany Plateau just west of the center of the state. It is marked by a steeply rolling to hilly topography although level or gently sloping areas occur on hill crests. The drainage is northeastward into the West Branch of the Susquehanna.—Excellent railroad facilities are available in the county. Public roads are numerous and well kept. Coal mining and lumbering are the principal industries although agriculture is practiced over all of the county except the hilly unproductive northern section.—The climate is healthful. The winters are cold and the summers cool and pleasant. The mean temperature is 46°F., the mean for January being 23°F. and that of July 70.6°F. A well distributed rainfall of 44 inches occurs. The growing season ranges from 116 to 154 days.—The soils of the county are largely of the *Dekalb* series, an upland residual soil from the shales and sandstones of the Coal Measures. This series universally is in need of lime. Twenty per cent of the series is too rough and stony for cultivation. The level portions, however, are quite productive when well managed. Gravelly, sandy and stony types predominate.—The alluvial soils of the area are not extensive as the streams flow through narrow valleys. When such soils occur they are usually wet and unproductive. Second bottom deposits (*Holston* series) while of very small area are rich and grow excellent grain, hay and truck.—Corn, oats, wheat, buckwheat, rye, timothy, clover, potatoes and vegetables are the principal crops. Alfalfa is raised in small acreage. Apples, pears, plums and cherries are grown but usually only for home use. Dairying is carried on in a small way. Some hogs, sheep and beef cattle are raised on almost every farm.—*H. O. Buckman.*

PEAT AND MUCK

1681. Anonymous. **New Jersey peat industry in 1917.** Jour. Amer. Peat. Soc. **12**: 188. 1919.—Peat production for fertilizer was greatly stimulated during the war. New Jersey leads all the other states in this. The peat is mostly treated chemically and then inoculated with bacteria to increase its fertilizer value. Some peat is used as an antiseptic and some for stock feed.—*G. B. Rigg.*

1682. Bottomley, W. B. **Nucleic derivatives from peat.** Jour. Amer. Peat Soc. **12**: 226. 1919.—See Bot. Absts. 4, Entry 1488.

1683. Cutting, M. C. **Peat soils of Minnesota and their cultivation.** Jour. Amer. Peat Soc. **12**: 190–194. 1919.—See Bot. Absts. 4, Entry 54.

1684. Feilitzen, H. von. **Cultural experiments on moor lands.** Jour. Amer. Peat Soc. **12**: 216–217. 1919.—See Bot. Absts. 4, Entry 64.

MISCELLANEOUS

1685. Jennings, A. C. **The economic aspect of irrigation.** Rhodesia Agric. Jour. **16**: 429–432. 1919.

1686. Sim, T. H. **Soil erosion and conservation.** South African Jour. Indust. 2: 962–968. 1919.—Afforestation is the key to soil conservation, and it is possible to make it effective in many localities where meantime soil conservation is badly needed; nevertheless afforestation and soil conservation belong to separate, and usually widely separated districts, the former only acting to the other district as the transmitter of the moisture which it requires in order to grow and maintain an efficient vegetation. Afforestation is a matter of the first importance, indeed it is the controlling factor as to whether or not the sub-continent shall remain for long habitable enough to permit of the community dealing much further with all or any of its other "burning subjects."—*E. P. Phillips.*

1687. Talbot, H. W. **Definition of peat.** Jour. Amer. Peat Soc. 12: 212. 1919.—"Peat is partly decomposed and disintegrated vegetable matter that has in one way or another accumulated in areas of poor drainage where chemical changes, incident to ordinary atmospheric conditions have been retarded or suspended."—*G. B. Rigg.*

1688. Torrance, Wm. **Observations on soil erosion.** Union of South Africa Dept. Agric., Bull. Gen. Ser. 1919[4]. *Pl. 1–8.* 1919.

1689. Wright, C. Harold. **The alluvial soils of Fiji.** Dept. Agric. Fiji Bull. 11. *12 p.* 1919.—Mechanical and chemical analyses of the alluvial soils of Fiji, with notes on their relations to banana and sugar-cane culture.—*C. V. Piper.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

1690. Anonymous. **Additions to the herbarium.** Brooklyn. Bot. Gard. Rec. 8: 142–143. Oct., 1919.—Accessions to the herbarium of the Brooklyn Botanic Garden in 1919 include the personal herbarium of woody plants (6000 specimens), collected and determined by Camillo Karl Schneider at the Arnold Arboretum, 1916–1919.—*C. S. Gager.*

1691. Bates, J. M. **Kochia alata.** Amer. Bot. 25: 110. 1919.—Further notes on the specific distinctness of *Kochia alata* from *K. scoparia.*—*W. N. Clute.*

1692. Beauvisage, L. **Étude anatomique de la famille des Ternstroemiacées. [Anatomical studies in the family Ternstroemiaceae.]** Univ. de Toulouse Faculté de Médecine et de Pharmacie No. 24. *230 p. 109 fig.* 1918.

1693. Beccari, O. **Palms of the Philippine Islands collected and distributed by A. D. E. Elmer.** Leafl. Philippine Bot. 8: 2997–3067. Aug. 25, 1919 (Article 120).—This article contains notes on about 75 species of palms, in many cases these data being of special value as they are reproductions of the collector's field notes covering the gross characters, habit, and appearance of the various species. The following are described as new: *Areca Caliso*, *Pinanga sibuyanensis*, *P. urdanetensis*, *Ptychoraphis intermedia*, *Heterospathe sibuyanensis*, *Orania philippinensis* Scheff. var. *sibuyanensis*, *O. decipiens* var. *montana*, *Caryota Rumphiana* Mart. var. *philippinensis*, *Livistona rotundifolia* Mart. var. *luzonensis* et var. *microcarpa*, *Daemonorops pannosus*, *D. oligolepis*, *D. urdanetensis*, *D. pedicellaris*, *D. affinis*, *D. gracilis*, and *Calamus vinosus*. The following new combinations occur: *Ptychoraphis Elmeri* (*Heterospathe Elmeri* Becc.), and *Heterospathe philippinensis* (*Ptychoraphis philippinensis* Becc.). A key to the genera, prepared by Mr. Elmer, is included.—*E. D. Merrill.*

1694. Becker, Wilh. **Violae Asiaticae et Australenses. III. [Violets of Asia and Australia. III.]** Beih. Bot. Centralbl. 36[II]: 15–59. 1918.—In this article are treated the groups *Curvato-pedunculatae* W. Bckr. (with subgroups *Flagellatae* Kittel and *Eflagellatae* Kittel), *Vaginatae* W. Bckr., *Cinereae* (Boiss. mutat. charact. et p. p.) W. Bckr., *Dischidium*

Ging. (with subgroups *Longicalcaratae* W. Bckr. and *Brevicalcaratae* W. Bckr.), *Chamaemelanium* Ging. (with subgroups *Monophyllos* W. Bckr. and *Nudicaules* W. Bckr.). In these groups there are presented as new names: *Viola odorata* L. var. *Amani* (Post) W. Bckr. comb. nov., *V. pontica* (southern Russia, Caucasus, Turkestan, etc.), *V. alba* Besser subsp. *Sintenisii* (W. Bckr.) W. Bckr. comb. nov., *V. cinerea* Boiss. var. *Stocksii* (Boiss.) W. Bckr. comb. nov., *V. cinerea* Boiss. var. *Stocksii* (Boiss.) W. Bckr. forma *kathiawarensis* (W. Bckr.) W. Bckr. comb. nov., *V. biflora* L. vars. *hirsuta* W. Bckr. (Sikkim) and *nudicaulis* W. Bckr. (Thibet), *V. Delavayi* Franchet var. *cillosa* W. Bckr. (eastern Thibet), *V. orientalis* W. Bckr. var. *conferta* (southeastern Manchuria etc.). An additional list, with descriptions, of new violets from Asia is appended. These are *V. sphaerocarpa* (central China), *V. pendulicarpa* (northern China), *V. kansuensis* (northern China), *V. carnosula* (Kamchatka), *V. placida* (Sikkim) and *V. tenuicornis* W. Bckr. var. *brachytricha* (China, prov. Schensi).—*Earl E. Sherff.*

1695. Bennett, A. **Helosciadium inundatum L. (Koch) f. fluitans (Fr.) Prahl.** Jour. Botany **57**: 260. 1919.—A note on its publication, character, and occurrence near Holyhead. —*K. M. Wiegand.*

1696. Bennett, A. **Utricularia.** Jour. Botany **57**: 260. 1919.—A note on the occurrence of incorrect measurements in books regarding *U. vulgaris*, *U. major*, *U. intermedia* and *U. minor*.—*K. M. Wiegand.*

1697. Blake, S. F. **The anay, a new edible-fruited relative of the avocado.** Jour. Washington [D. C.] Acad. Sci. **9**: 457–462. *Fig. 1.* 1919.—Two new species of the genus *Hufelandia*, both collected in Central America, are described. The fruit of one is somewhat similar to the avocado and it is believed that the tree can be grown in Florida. The fruit of the second is not known.—*Helen M. Gilkey.*

1698. Blake, S. T. **A new salvia from Guatemala.** Proc. Biol. Soc. Washington [D. C.] **32**: 187–188. 1919.—*Salvia hempsteadiana* Blake is described as a new species from specimens collected in Guatemala by Mr. Wilson Popenoe, of the Bureau of Plant Industry. Its abundance of azure blue flowers gives promise of horticultural value.—*J. C. Gilman.*

1699. Blake, S. T. **New plants from Sinaloa.** Proc. Biol. Soc. Washington [D. C.] **32**: 189–194. 1919.—*Polygala sinaloae* Blake, *Parsonsia blepharophylla* Blake, *Piptothrix sinaloae* Blake, *Perymenium stenophyllum* Blake, *Verbesina Ortegae* Blake, and *Otopappus Salazari* Blake are described as new species from the District of San Ignacio, Sinaloa, Mexico. They were collected by Señor A. E. Salazar under the direction of Señor J. G. Ortega, head of the Department of Agriculture, Department of Sinaloa and Nayarit.—*J. C. Gilman.*

1700. Bödeker, Friedrich. **Echinocactus Joossenianus Böd. spec. nov.** Monatsschr. für Kakteenkunde **28**: 38–44. 1918.—Under the name given in the title the author describes and illustrates a new species of cactus which is a native of Paraguay or northern Argentina.—*J. M. Greenman.*

1701. Bödeker, Friedrich. **Mamillaria erythrosperma Böd. spec. nov.** Monatsschr. für Kakteenkunde **28**: 101–105. 1918.—The author describes and illustrates under the name given in the title a new species of cactus and designates a variety of it as var. *similis* De Laet. The species is a native of Mexico.—*J. M. Greenman.*

1702. Bornmüller, Jos. **Über den Formenkreis von Cercis Siliquastrum L. und Cercis Griffithii Boiss. [On forms of Cercis Siliquastrum L. and Cercis Griffithii Boiss.]** Beih. Bot. Centralbl. **36**$^{\text{II}}$: 1–14. 1918.—The taxonomic characters of *Cercis Siliquastrum* L. and of *C. Griffithii* Boiss. are enumerated and contrasted. They relate mainly to (1) pubescence of fruits, peduncles and leaves, (2) form and size of fruits, as also the breadth of their winged margins and (3) the size of flowers. A tabulated summary with descriptions, of old and new varieties, subvarieties, forms, and subforms is presented for both species.—*Earl E. Sherff.*

1703. Bornmüller, Jos. **Über eine neue Scutellaria aus der Flora von Buchara. [On a new Scutellaria from Buchara.]** Beih. Bot. Centralbl. 36^{II}: 60–61. 1918.—*Scutellaria Fedtschenkoi* Bornm. (Allg. Bot. Zeitschr., Jahrg. 1914: Nr. 1–2, S. 8, *nomen nudum*) is here given a Latin description. The species is native to Buchara, Prov. Baissun (type, *Bornmüller*, Plantae Turkestanicae 1150, Aug. 22, 1913, Hb. Bornmüller, also Hb. Petropol.).—*Earl E. Sherff.*

1704. Bornmüller, J. **Notizen zur Flora Oberfrankens, nebst einigen Bemerkungen über Bastarde und eine neue Form von Polystichum Lonchitis (L.) Roth in Alpengebiet. [Notes on the flora of Upper Franconia together with some observations on hybrids and a new form of Polystichum Lonchitis (L.) Roth in the Alpine region.]** Beih. Bot. Centralbl. 36^{II}: 183–199. *Pl. 1.* 1918.—Various notes are given on the distribution, variation and occurrence of hybridity for certain spermatophytes and pteridophytes, chiefly of Upper Franconia. *Turritis glabra* L. f. *multicaulis*, *Crataegus Oxyacantha* L. var. *lagenariformis*, *Carduus nutans* L. var. *ortholepis*, *Polystichum* (*Dryopteris*) *Lonchitis* (L.) Roth f. *Reinecki* are described as new. The last two are illustrated (Pl. 1). Various hybrids in *Verbascum*, *Asplenium* and *Polystichum* are described and rather extended notes upon varying forms of *Sorbus* species and *Prenanthes purpurea* L. are given.—*Earl E. Sherff.*

1705. Bornmüller, J. **Revisions-Ergebnisse einiger orientalischer und zentralasiatischer Arten der Gattung Echinops. [Results of revisions of some oriental and central Asiatic species of the genus Echinops.]** Beih. Bot. Centralbl. 36^{II}: 200–218. 1918.—No attempt is made to monograph the oriental species of *Echinops*. However, the author's more important results in a revision study of these species are presented. Under the section *Oligolepis* Bunge he describes 5 new species and 2 new varieties from Persia, namely, *Echinops lalesarensis* (*J. Bornmüller*, Iter Persico-turcicum 1892–93 no. 4055 pro parte, prov. Kerman) and var. *adenocaulis* (in consortio typi, no. 4055 pro parte, *E. elymaiticus* (central western Persia, types in Hb. Haussknecht and Hb. Bornmüller), *E. erioceras* (*Th. Alexeenko* no. 749, prov. Irak), *E. leiopolyceras* (*J. Bornmüller*, Iter Persicum no. 7325, in deserts between Teheran and Demawend, northern Persia, *E. ecbatanus* (Elwend, near Hamadan, northwestern Persia) and *E. ilicifolius* Bunge var. *glanduliger* (*J. Bornmüller*, Iter Persico-turcicum 1892–93 no. 4053, prov. Yesd, southeastern Persia). *Pleiacme* is introduced as a new section of the genus and under it one new species, *E. cervicornis* (*J. Bornmüller*, Iter Persico-turcicum 1892-93 no. 4054, Prov. Yesd, southeastern Persia) is described. Under the section *Ritrodes* Bunge is described *E. gedrosiaca* (*J. Bornmüller*, Iter Persico-turcicum 1892–93 no. 403, prov. Laristan, near the town Bender-Abbas, in the country once called Gedrosia; a single specimen) and the var. *macroseras* (*C. B. Clarke* 34787 E, Cheerkee, Hazaribagh, Chota Nagpore (?). Observations are given upon the species of *Echinops* (globe thistle, Kugeldistel) in the flora of the Himalayas, of Thibet and of Arabia. Two new species of the section *Oligolepis* Bunge are presented. These are *E. argyrocomus* (*J. Bornmüller*, Plantae Turkestanicae itin. B. A. Fedtschenko Samarkand, Turkestan) and *E. transcaspicus* (*P. Sintenis*, Iter Transcaspico persicum 1900–01 no. 688, Aschabad, Suluklii, Transcaspian region, at the Persian boundary). —*Earl E. Sherff.*

1706. Briquet, John, and Fr. Cavillier. **Notes sur quelques Phanérogames de l'Oberland bernois. [Notes on some Phanerogams of the Bernese Oberland.]** Ann. Conserv. et Jard. Bot. Geneve **20**: 222–261. Aug. 1, 1918.—This article consists of the enumeration of flowering plants of the Bernese Oberland and includes several new varieties and forms.—*J. M. Greenman.*

1707. Burgess, J. L., and C. H. Waldron. **Farm weeds of North Carolina and methods for their control.** Bull. North. Carolina Dept. Agric. 40^{8}: 3–53. *Illust.* 1919.—See Bot. Absts. 3, Entry 1860.

1708. Camus, Aimée. **Note sur une Graminée d'Indo-Chine: Cymbopogen effusus A. Camus. [Note on a grass of Indo-China.]** Bull. Mus. Nat. Hist. Nat. Paris **24**: 536–538. 1918. —The author transfers *Themeda effusa* Balansa (*Anthistiria Balansae* Crevost & Lemairé), a species from Tonkin, China, to *Cymbopogon*.—*J. M. Greenman.*

1709. Camus, Aimée. **Note sur la genre Iseilema (Graminées). [Note on the genus Iseilema [Gramineae).]** Bull. Mus. Nat. Hist. Nat. Paris 24: 539-541. 1918.—Six species of this genus occurring in the region of Indo-China and Australia are characterized. One of which, namely *Iseilema Thorelii* from Laos, is new to science.—*J. M. Greenman.*

1710. Chevalier, A. **Premier inventaire des bois et autres produits forestiers du Tonkin. [First inventory of the timbers and other forest products of Tonkin.]** Bull. Écon. Indochine 22: 495-540. 1919.—This is the third and concluding paper of the series, the two preceding ones having been published in the same periodical in 1918. The present paper contains a brief discussion of certain forest plants of economic importance, including a few bamboos, some palms, plants producing tanning materials, dyes, resins, oil, lacquer, benzoin, rubber, paper making materials, those with fragrant flowers and woods of commercial utility, cinnamon, tea, and other products of minor importance. *Thea Gilberti* A. Chev. and *T. Fleuryi* A. Chev. are proposed as new species. *Livistona saribas* (Lour.) Merr. appears as a new combination. *Liquidambar tonkinensis* A. Chev. is reduced to *L. formosana* Hance and *Dasilipa Pasquieri* Dubard is transferred to *Bassia* as *B. Pasquieri* Lecomte.—*E. D. Merrill.*

1711. Clokey, Ira W. **Carex notes.** Rhodora 21: 83-85. 1919.—Descriptions and type localities of three new Carices, *Carex arapahoenis* spec. *nov.*, *C. subimpressa spec. nov.*, and *C. tribuloides Wahl. var. sangamonensis var. nov.—James P. Poole.*

1712. Cockerell, T. D. A. **Helianthus Besseyi Bates.** Torreya 19: 197-198. 1919.—This species, originally published in 1914, is confirmed and redescribed from a study of specimens grown during the past season in the author's garden. The relationship between *H. Besseyi* and *H. apricus* Lunell is still a matter for investigation.—*J. C. Nelson.*

1713. Coulter, J. M. **New African plants.** [Rev. of: Moore, Spencer LeM. **Alabastra diversa. Part XXIX.** Jour. Bot. 56: 225-233. 1918. (See Bot. Absts. 1, Entry 1112.)] Bot. Gaz. 67: 184. Feb., 1919.

1714. Coulter, J. M. **Aquilegia.** [Rev. of: Payson, Edwin Blake. **The North American species of Aquilegia.** Contrib. U. S. Nation. Herb. 20: 133-157. *7 pl.* 1918. (See Bot. Absts. 1, Entry 1119.)] Bot. Gaz. 67: 184. Feb., 1919.

1715. Coulter, J. M. **A new genus of Compositae.** [Rev. of: Pritzel, E. **Basedowia, eine neue Gattung der Compositen aus Zentral-Australien. (Basedowia, a new genus of Compositae from Central Australia.)** Ber. Deutsch. Bot. Ges. 36: 332-337. *Pl. 12.* 1918.] Bot. Gaz. 67: 280. 1919.

1716. Coulter, J. M. **Tropical species of Eupatorium.** [Rev. of: Robinson, B. L. **I. Diagnoses and notes relating to tropical American Eupatorieae. II. A descriptive revision of the Colombian Eupatoriums. III. Keyed recensions of the Eupatoriums of Venezuela and Ecuador.** Proc. Amer. Acad. Arts and Sci. 54: 235-267. 1918. (See Bot. Absts. 1, Entry 810.)] Bot. Gaz. 67: 280. 1919.

1717. Coulter, J. M. **The orchids of Java.** [Rev. of: Smith, J. J. **Die Orchideen von Java. (The orchids of Java.)** Bull. Jard. Bot. Buitenzorg 26: 1-135. 1918. (See Bot. Absts. 2, Entry 370.)] Bot. Gaz. 67: 280. 1919.

1718. Coulter, J. M. **Selaginella.** [Rev. of: Van Eseltine, G. P. **The allies of Selaginella rupestris in the southeastern United States.** Contrib. U. S. Nation. Herb. 20: 159-172. *8 pl., 8 fig.* 1918. (See Bot. Absts. 1, Entry 1439.)] Bot. Gaz. 67: 183. Feb., 1919.

1719. Davidson, Anstruther. **Lupinus subhirsutus n. sp.** Bull. Southern California Acad. Sci. 18: 80. 1919.—The author describes as new, *Lupinus subhirsutus* from Palm Springs, California.—*Roxana S. Ferris.*

1720. Downes, H. **Juncus pygmaeus Rich.** Jour. Botany 57: 260. 1919.—A note on its occurrence in the Land's End and Lizard Districts of Cornwall.—*K. M. Wiegand.*

1721. Elmer, A. D. E. **Zingiberaceae of the Sorsogon Peninsula.** Leafl. Philippine Bot. 8: 2963–2995. 1919.—The following Philippine species are described as new: *Adelmeria albida, Alpinia congesta, A. longipetiolata, A. vulcanica, Amomum bulusanense, A. linearifolium, A. luzonense, Hornstedtia irosinensis, H. peninsula, H. purpurea, H. sorsogonensis, H. subviridis, Zingiber bulusanense,* and *Z. zerumbet* Sm. var. *magnum. Adelmeria gigantifolia* (*Zingiber gigantifolium* Elm.), *Amomum conoideum* (*Hornstedtia conoidea* Ridl.), *Hornstedtia pandanicarpa* (*Amomum pandanicarpum* Elm.) and *H. propinquua* (*Amomum propinquum* Ridl.), appear as new combinations. Notes are given on many other species.—*E. D. Merrill.*

1722. Farwell, Oliver Atkins. **Bromelica (Thurber): A new genus of grasses.** Rhodora 21: 76–78. 1919.—The eastern species of Oat Grass have always been changed about with considerable uncertainty, being placed at different times in five different genera, namely, *Festuca, Bromus, Melica, Avena,* and *Trisetum,* and even today these species are listed under different genera in different manuals. The present author finds that they do not fit in exactly under any of these genera, but appear to be intermediate between *Bromus* and *Melica,* consequently he proposes, *Bromelica* (Thurber) *n. gen.* to include *B. striata* (Mx.) *n. comb., B. Smithii* (Porter) *n. comb., B. aristata* (Thurber) *n. comb., B. subulata* (Bong.) *n. comb., B. Harfordii* (Boland.) *n. comb., B. Harfordii var. minor* (Vasey) *n. comb., B. Geyeri* (Munro) *n. comb.,* and *B. Geyeri var. Howellii* (Scribn.) *n. comb.* The synonymy of these species and varieties is given.—*James P. Poole.*

1723. Fernald, M. L. **Carex flava, var. gaspensis in Vermont.** Rhodora 21: 40. 1919.—Characteristic sheet of this variety found in the herbarium of the late George G. Kennedy, collected at Willoughby, Vermont in 1896. Apparently the first record from Vermont.—*James P. Poole.*

1724. Fernald, M. L. **Helianthemum Bicknellii and H. propinquum.** Rhodora 21: 36–37. 1919.—Author proposes name *Helianthemum Bicknellii nom. nov.* for *H. majus* of present day manuals. Blake had recently taken up the name *H. propinquum* for Bicknell's *H majus,* but present author in study of flora of Cape Cod finds distinct specific differences between *H. propinquum* and *H. Bicknellii.*—*James P. Poole.*

1725. Fernald, M. L. **Lomatogonium the correct name for Pleurogyne.** Rhodora 21: 193–198. 1919.—The writer has discovered that the name *Pleurogyne,* first given to the genus, so long known by that name, by Chamisso and Schlectendal and later taken up by Grisebach who ascribed it to Eschscholtz, is clearly antedated by *Lomatogonium* first published by Alexander Braun. The bibliography of the genus and of the single North American species, *L. rotatum,* is given. Variations in the North American plants which have been distinguished as varieties, and in one case as a distinct species (*P. fontana* A. Nelson), are all designated as forms of *L. rotatum* because of the abundance of transitional specimens between these variations and the typical material. The bibliography of the Old World species is also given.—*James P. Poole.*

1726. Fernald, M. L. **Nymphozanthus the correct name for the cow lilies.** Rhodora 21: 183–188. 1919.—The writer demonstrates that *Nymphozanthus,* as proposed by L. C. Richard for the cow lilies, antedates the prelinnean name *Nuphar* first published by Smith. The article is concluded with the status of the generic names of these plants as it seems to be at present, and a list of the principal species of *Nymphozanthus,* chronologically arranged, with synonyms and citations of authorities.—*James P. Poole.*

1727. Fuller, George D. **Winter botany.** [Rev. of: Trelease, William. **Winter botany.** *394 p., 327 fig.* William Trelease: Urbana, 1918. (See Bot. Absts. 2, Entry 638.)] Bot. Gaz. 67: 173–174. Feb., 1919.

1728. Guerin, Paul. **L'Urera Humblotii H. Baillon et ses affinities. [Urea Humblotii and its affinities.]** Compt. Rend. Acad. Sci. Paris 168: 517–519. 1919.—*Urera Humblotii* was described in 1885 by H. Baillon and was rediscovered in quantity by R. Vignier in the eastern part of Madagascar, where it is locally known as "Ampy." A comparison of the recent collections with those of Baillon leads to the conclusion that *U. Humblotii* is merely a vigorous form of *U. longifolia* Wedd., another species from Madagascar, the two being strictly analagous in floral characters and identical in leaf anatomy. *U. Humblotii* also possesses in the cortex and occasionally in the pericycle a series of laticiferous tubes similar to *U. baccifera* Gaud., a South American form. This laticiferous system is analagous to that found in the Moraceae and Artocarpaceae, and is generally believed to be lacking in the Urticaceae.—*F. B. Wann.*

1729. Hassler, E. **Aspicarpa, Gaudichaudia, Camarea, Janusia adjectis nonnullis notulis de Malpighiaceis paraguariensibus. [Aspicarpa, including Guadichaudia, Camarea, and Janusia with additional notes on the Malpighiaceae of Paraguay.]** Ann. Conserv. et Jard. Bot. Genève 20: 203–214. 30 May, 1918.—A synopsis is given of the species included under *Aspicarpa.* Several new combinations are made and critical notes are recorded concerning a number of the species enumerated.—*J. M. Greenman.*

1730. Henderson, Margaret W. **A comparative study of the structure and saprophytism of the Pyrolaceae and Monotropaceae with reference to their derivation from the Ericaceae.** Contrib. Univ. Pennsylvania Bot. Lab. 5: 42–109. *Fig. 1–10.* 1919.—See Bot. Absts. 3, Entry 2434.

1731. Hitchcock, A. S., and Paul C. Standley. **Flora of the District of Columbia and vicinity.** Contrib. U. S. Nation. Herb. 21: 1-329. *Pl. 1–42, fig.* 1. 1919.—This work, which has been prepared with the assistance of many of the botanists of Washington, replaces Ward's Flora of 1881 and its six supplements. There is a short general account of the region, two keys to families, one chiefly by leaves, the other by floral characters, an annotated list of the species, and a glossary. Keys to the genera and species are given under their appropriate headings; and 1630 species are formally listed in the work, 287 of which are introduced, and 108 others, known only as waifs, are incidentally mentioned. The illustrations represent localities of interest about Washington and some of the characteristic flowers of the region. —*S. F. Blake.*

1732. Johnston, I. M. **Contributions on Southern California botany.** Bull. Southern California Acad. Sci. 18: 18–21. 1919.—With notes on various Southern California plants, the author describes the following species and varieties as new to science: *Monardella saxicola, M. lanceolata* Gray var. *glandulifera,* and *Corethrogyne filanginifolia* (H. & A.) Nutt. var. *pinetorum.*—*Roxana S. Ferris.*

1733. Knowlton, C. H., and Walter Deane. **Reports on the flora of the Boston district, XXX.** Rhodora 21: 78–83. 1919.—See Bot. Absts. 4, Entry 342.

1734. Koidzumi, Geniti. **Contributiones ad floram Asiae orientalis.** Bot. Mag. Tôkyô 33: 110–129. 1919.—Continued from Volume 22, and to be concluded in future numbers. Contains new species and varieties in the following genera. *Aconitum* 1, *Angelica* 1, *Aster* 1, *Cirsium* 4, *Claoxylon* 1, *Corydalis* 1, *Disporum* 1, *Euphorbia* 1, *Jasminum* 1, *Lypsimachia* 1, *Pennisetum* 1, *Pisonia* 1, *Platanthera* 1, *Polygonatum* 4, *Pyrus* 13, *Salix* 2, *Wichstroemia* 1. —*L. R. Abrams.*

1735. Koorders, S. H., and Th. Valeton. **Atlas der Baumarten von Java im anschluss an die "Bijdragen tot de Kennis der Boomsoorten van Java." [Atlas of Javanese trees, an appendix to "Contributions to our knowledge of the tree of species of Java."]**—Vol. 1, *Pl. 1–200.* 1913; Vol. 2, *Pl. 201–400.* 1913–14; Vol. 3, *Pl. 401–600.* 1914–15; Vol. 4, *Pl. 601–800,* Index and errata, 1916-18. F. P. W. M. Trap, Leiden.—This work, as the title indicates, presents

figures of Javan tree species illustrating about as many species as there are plates (800), previously described in the "Bijdragen tot de Kennis der Boomsoorten van Java." [Contributions to a knowledge of the tree species of Java.] Vols. 1-12, 1894-1910. The Atlas was issued in 16 parts of 50 plates each, forming four volumes. Descriptions are not given in the work under consideration, but references are included to the text of the "Boomsoorten" and to other literature, with the addition of the local names and explanations of the figures.—*E. D. Merrill.*

1736. Koorders, S. H. **Flora von Tjibodas umfassend die Blütenpflanzen welche in der botanischen Tjibodas-Waldreserve und oberhalb derselben auf den West-Javanischen Vulkanen Pangerango und Gede wildwaschend vorkommen. [Flora of Tjibodas, Java.]** Visser & Co., Batavia, Java. 1918-1919.—This publication, in the form of manual, with keys to and descriptions of the genera and species, is to be issued in three volumes, of which the following have appeared: Vol. 1, part 1, pp. 1-54, introductory; Vol. 1, part 3, pp. 1-128, Orchidaceae; Vol. 3, part 1, pp. 1-44, Ericaceae to Plantaginaceae; and Vol. 3, part 2, pp. 1-87, Rubiaceae to Compositae.—*E. D. Merrill.*

1737. Koorders, S. H. **Supplement op het Eerste Overzicht der Flora van N. O. Celebes. [Supplement to the first review of the flora of north-eastern Celebes.]** P. 1-30. *Pl. 1-10.* 1918. Visser & Co., Batavia, Java.—The following species are described and figured in detail amplifying the brief original descriptions: *Wallaceodendron celebicum* Kds., *Couthovia celebica* Kds., *Gleditschia Rolfei* Vidal, *Albizzia minahassae* Kds., *Polythyrsis Stapfii* Kds., *Cyrtandra hypogaea* Kds., *Spiraeopsis celebica* Miq., *Reinwardtiodendron celebicum* Kds., *Diospyros utilis* Kds. & Val., and *Sloanea celebica* Boerl. & Kds.—*E. D. Merrill.*

1738. Lacaita, C. **Piante Italiene critiche o rare. [Critical or rare plants of Italy.]** Nuovo Gior. Bot. Ital. 25: 193-223. 1918.—The author continues his enumeration of critical or rare plants of Italy with copious notes and includes the description of a new species of *Thymus*, namely *T. sacer*, from the Province of Salerno.—*J. M. Greenman.*

1739. Lacaita, C. C. **Two critical plants of the Greek flora.** Jour. Linn. Soc. London 44: 125-129. 1918.—The author confirms Čelakovsky's reduction of *Thymus lanceolatus* Sibth. & Sm., not Desf., and *T. heterotrichus* Griseb. to *T. Sibthorpii* Benth. A new species of *Crepis* is described, namely *C. rutilans*, from the Island of Corfu.—*J. M. Greenman.*

1740. Lecomte, Nenri. **Une espèce Indo-Chinoise du genre Sarcosperma, de la famille Sapotacées. [A species of the genus Sarcosperma of the family Sapotaceae from Indo-China.]** Bull. Mus. Nat. Hist. Nat. Paris 24: 534, 535. 1918.—*Sarcosperma tonkinensis* is described as a new species from Tonkin, China.—*J. M. Greenman.*

1741. Léon, Brother. **A new Cuban Sida.** Torreya 19: 172-173. 1919.—*Sida Brittoni* Fr. Léon is described, the type from Chirigota, Pinar del Rio, Cuba. This species has been referred to *S. ciliaris* L., but is shown to be clearly distinct.—*J. C. Nelson.*

1742. Lind, J. **Apoteker C Heerfordts Herbarier. [The herbarium of the chemist. C. Heerfordt.]** Bot. Tidsskr. 36: 1-19. 1917.—Although this herbarium is 260 years old, the various plants are as well preserved as if they had been only mounted a year ago. This herbarium consists principally of herbaceous forms, many being medicinal plants.—*A. L. Bakke.*

1743. Macbride, J. Francis. **I. Notes on certain Leguminosae. II. Reclassified or new Spermatophytes, chiefly North American.** Contrib. Gray Herb. Harvard Univ. New Ser. 59: 1-39. 1919.—The following new combinations, with the name-bearing synonym in parentheses, new names and species new to science are included: *Inga vera* Willd. var. *lamprophylla* (*Inga vera* Willd. subsp. *lamprophylla* Pittier), *I. vera* Willd. var. *portoricensis* (*I. vera* Willd. subsp. *portoricensis* Pittier), *Enterolobium gummiferum* (*Pithecolobium gummiferum* Mart.), *Samanea flexicaulis* (*Acacia flexicaulis* Benth.), *S. Schaffneri* (*Pithecolobium Schaffneri* Wats.), *Pithecolobium mangense* (*Mimosa mangensis* Jacq.), *P. cochliocarpum*

(*Mimosa cochliocarpos* Gomez), *P. heterophyllum* (*Mimosa heterophylla* Roxb.), *P. heterophyllum* (Roxb.) Macbr. var. *intermedium* (*P. angulatum* Benth. var. *intermedia* Prain), *Albizzia distachya* (*Mimosa distachya* Vent.), *A. Zygia* (*Inga Zygia* DC.), *A. microphylla* (*Mimosa microphylla* Roxb.), *A. sassa* (*Inga sassa* Willd.), *Calliandra formosa* (Kunth) Benth. var. *gracilis* (*C. gracilis* Klotzsch), *C. formosa* (Kunth) Benth. var. *cubensis*, *C. unijuga* Rose var. *pueblensis*, *C. anomala* (*Inga anomala* Kunth), *C. anomala* (Kunth) Macbr. var. *Callistemon* (*Acacia Callistemon* Schlecht.), *C. Selloi* (*Acacia Selloi* Spreng.), *C. hirsuta* (G. Don) Benth. var. *Sancti-Pauli* (*C. Sancti-Pauli* Hassk.), *C. haematomma* (Bert.) Benth. var. *pubescens* (*C. haematostoma* Urb. var. *pubescens* Urb.), *C. haematomma* (Bert.) Benth. var. *minutifolia* (*C. haematostoma* Urb. var. minutifolia Urb.), *Lysiloma divaricata* (*Mimosa divaricata* Jacq.), *Acacia Bilimekii*, *A. aculeatissima*, *A. paniculata* (*Mimosa paniculata* Wendl.), *A. terminalis* (*Mimosa terminalis* Salisb.), *A. binervia* (*Mimosa binervia* Wendl.), *A. caesia* (L.) Willd. var *oxyphylla* (*A. Intsia* (L.) Willd. var. *oxyphylla* Grah.), *A. simplicifolia* (*Mimosa simplicifolia* L. f.), *A. linearis* (*Mimosa linearis* Wendl.), *A. ciliata* R. Br. var. *brevifolia* (*A. strigosa* Link, var. *brevifolia* Meissn.), *A. ciliata* R. Br. var. *intermedia* (*A. strigosa* Link, var. *intermedia* E. Pritzel), *A. undulaefolia* Fraser, var. *piligera* (*A. piligera* A. Cunn.), *A. pulchella* R. Br. var. *fagonioides* (*A. fagonioides* Benth.), *Schrankia microphylla* (Mimosa microphylla Dryand.), *S. quadrivalvis* (L.) Merrill, var. *jaliscensis*, *S. pilosa* (*Morongia pilosa* Standley), *Mimosa aculeaticarpa* Ort. var. *desmanthocarpa* (*M. acanthocarpa* (Willd.) Benth. var. *desmanthocarpa* Robinson), *M. aculeaticarpa* Ort. var. *imparilis*, *M. Standleyi*, *M. Benthami*, *M. Benthami* Macbr. var. *malacocarpa* (*M. fasciculata* (Kunth) Benth. var. *malacocarpa* Robinson), *M. bimucronata* (DC.) Ktze. var. *hexandra* (*M. hexandra* Micheli), *M. leprosa* (*M. calodendron* Mart. var. *leprosa* Bong.), *M. globosa* (*Prosopis globosa* Gillies), *M. incana* (Spreng.) Benth. var. *robusta*, *M. macrostachya* (*Schrankia macrostachya* Benth.), *M. macrostachya* Benth. Macbr. var. *glaberrima* (*M. millefoliata* Scheele, var. *glaberrima* Chod. & Hassl.), *M. paraguariae* Micheli, var. *induta* (*M. paraguariae* Micheli, var. *genuina* Hassl. forma *induta* Hassl.), *M. Herzogii*, *Desmanthus illinoensis* (Michx.) MacM. var. *glandulosus* (*Mimosa glandulosa* Michx.), *D. pumilus* (*Mimosa pumila* Schlecht.), *D. hexapetalus* (*Neptunia hexapetala* Micheli), *Caillica glomerata* (*Mimosa glomerata* Forsk.), *C. cinerea* (*Mimosa cinerea* L.), *C. platycarpa* (*Dichrostachys platycarpa* Welw.), *C. spicata* (*Neptunia spicata* Muell), *C. tenuifolia* (*Dichrostachys tenuifolia* Benth.), *Prosopis cineraria* (*Mimosa cineraria* L.), *P. farcta* (*Mimosa farcta* Russell), *Piptadenia gonoacantha* (*Acacia gonoacantha* Mart.), *P. fruticosa* (*Acacia fruticosa* Mart.), *P. adiantoides* (*Acacia adiantoides* Spreng.), *P. grata* (*Acacia grata* Willd.), *P. obliqua* (*Sophora obliqua* Pers.), *P. platycarpa* (*Goldmania platycarpa* Rose), *P. constricta* (*Goldmania constricta* Micheli & Rose), *Elephantorrhiza elephantina* (Burch.) Skeels, var. *Burkei* (*E. Burkei* Benth.), *Entada spicata* (*Mimosa spicata* E. Mey.), *Parkia Oliveri*, *P. peduncula'a* (*Mimosa pedunculata* Roxb.), *P. arborea* (*Paryphosphaera arborea* Karst.), *Cynometra phaselocarpa* (*Vouapa phaselocarpa* Hayne), *C. Martiana* (*Trachylobium Martianum* Hayne), *C. Martiana* (Hayne) Macbr. var. *procera* (*C. Spruceana* Benth. var. *procera* Benth.), *Crudia glaberrima* (*Hirtella glaberrima* Steud.), *C. tomentosa* (*Parivoa tomentosa* Aubl.), *Westia auriculata* (*Berlinia auriculata* Benth.), *W. bracteosa* (*Berlinia bracteosa* Benth.), *W. Eminii* (*Berlinia Eminii* Taub.), *W. paniculata* (*Berlinia paniculata* Benth.), *W. stipulacea* (*Berlinia stipulacea* Benth.), *W. angolensis* (*Berlinia angolensis* Welw.), *W. bifoliolata* (*Berlinia bifoliolata* Harms), *W. Sheffleri* (*Berlinia Sheffleri* Harms), *W. tomentosa* (*Berlinia tomentosa* Harms), *Macrolobium macrophyllum* (*Anthonotha macrophylla* Beauv.), *Bauhinia microstachya* (*Schnella microstachya* Raddi), *B. microstachya* (Raddi) Macbr. var. *bahiensis* (*B. bahiensis* Bong.), *B. bauhinioides* (*Perlebia bauhinioides* Mart.), *B. vestita* (*Schnella vestita* Benth.), *B. anamesa*, *B. Coulteri*, *B. Horsfieldii* (*Lasiobema Horsfieldii* Miq.), *B. Wallichii*, *Apuleja leiocarpa* (*Leptolobium ? leiocarpum* Vogel), *Cassia keyensis* (*Chamaecrista keyensis* Pennell), *C. brachiata* (*Chamaecrista brachiata* Pollard), *C. Deeringiana* (*Chamaecrista Deeringiana* Small & Pennell) *C. fasciculata* Michx. var. *robusta* (*C. Chamaecrista* L. var. *robusta* Pollard), *C. fasciculata* Michx. var. *depressa* (*C. depressa* Pollard), *C. fasciculata* Michx. var. *Tracyi* (*Chamaecrista Traceyi* Pollard), *C. fasciculata* Michx. var. *littoralis* (*Chamaecrista littoralis* Pollard), *C. fasciculata* Michx. var. *puberula* (*Chamaecrista puberula* Greene), *C. nictitans* L.

var. *multipinnata* (*C. multipinnata* Pollard), *C. nictitans* L. var. *Mohrii* (*C. aspera* Muhl. var. *Mohrii* Pollard), *C. aspera* Muhl. var. *Simpsoni* (*C. Simpsoni* Pollard), *C. savannarum* (*Chamaecrista savannarum* Britton), *C. granulata* (*C. portoricensis* Urb. Var. *granulata* Urb.), *C. pinctorum* (*Chaemaecrista pinctorum* Britton), *C. Tuerckheimii* (*Chamaecrista Tuerckheimii* Britton), *C. glandulosa* L. var. *Swartzii* (*C. Swartzii* Wickstr.), *C. bauhinioides* Gray var. *pilosior* Robinson, *C. bauhinioides* Gray var. *arizonica* Robinson, *Calochortus barbatus* (HBK.) Painter, var. *chihuahuanus* (*C. barbatus* (HBK.) Painter, subsp. *chihuahuanus* Painter), *Cryptocarya Bowiei* (*Laurus Bowiei* Hook.), *Sanicula Peckiana*, *Tauschia Kelloggii* (*Dewcya Kelloggii* Gray), *Viticella aurita* (*Nemophila aurita* Lindl.), *V. racemosa* (*Nemophila racemosa* Nutt.), *V. phacelioides* (*Nemophila phacelioides* Nutt.), *V. maculata* (*Nemophila maculata* Benth.), *V. Menziesii* (*Nemophila Menziesii* H. & A.), *V. Menziesii* (H. & A.) Macbr. var. *liniflora* (*Nemophila* liniflora F. & M.), *V. Menziesii* (H. & A.) Macbr. var. *atomaria* (*Nemophila atormaria* (F. & M.), *V. Menziesii* (H. & A.) Macbr. var. *integrifolia* (*Nemophila Menziesii* H. & A. var. *integrifolia* Parish), *V. Menziesii* (H. & A.) Macbr. var. *rotata* (*Nemophila rotata* Eastw.), *V. Kirtleyi* (*Nemophila Kirtleyi* Henderson), *V. pulchella* (*Nemophila pulchella* Eastw.), *V. heterophylla* (*Nemophila heterophylla* F. & M.), *V. heterophylla* (F. & M.) Macbr. var. *flaccida* (*Nemophila flaccida* Eastw.), *V. heterophylla* (F. & M.) Macbr. var. *tenera* (Eastw.) Nels. & Macbr. (*Nemophila tenera* Eastw.), *V. exilis* (*Nemophila exilis* Eastw.), *V. parviflora* (*Nemophila parviflora* Dougl.), *V. parviflora* (Dougl.) Macbr. var. *Austinae* (Eastw.) Nels. & Macbr. (*Nemophila Austinae* Eastw.), *V. parviflora* (Dougl.) Macbr. var. *Plaskettii* (*Nemophila Plaskettii* Eastw.), *V. pedunculata* (*Nemophila pedunculata* Dougl.), *V. pedunculata* (Dougl.) Macbr. var. *sepulta* (Parish) Nels & Macbr. (*Nemophila sepulta* Pairsh), *V. pedunculata* (Dougl.) Macbr. var. *densa* (Howell) Nels. & Macbr. (*Nemophila densa* Howell), *V. breviflora* (*Nemophila breviflora* Gray), *V. spatulata* (*Nemophila spatulata* Coville), *V. humilis* (*Nemophila humilis* Eastw.), *Phacelia dasyphylla* Greene, var. *ophitidis*, *Allocarya mexicana*, *Cordylanthus tenuis* Gray, var. *viscidus* (*Adenostegia viscida* Howell), *C. Hanseni* (*Adenostegia Hanseni* Ferris), *C. littoralis* (*Adenostegia littoralis* Ferris), *C. ramosus* Nutt. var. *puberulus*, *C. Helleri* (*Adenostegia Helleri* Ferris), *C. palmatus* (*Adenostegia palmata* Ferris), *Eriophyllum confertifolium* (DC.) Gray, var. *artemisiaefolium* (*Bahia artemisiaefolia* Less.).—*E. B. Payson.*

1744. Marshall, E. S. **Verbascum thapsiforme as a British plant.** Jour. Botany 57: 257–258. 1919.—This species was found by W. D. Miller and the writer in a botanically rich region near Holford, v. c. 5 S. Somerset. All previous records of the occurrence in the British Isles are apparently unfounded. It is similar to *V. Thapsus*, and is a close relative of *V. phlomoidis* L. with which the writer would write it as var. (or subsp.) *thapsiforme Coste.* Schrader's original description of *V. thapsiforme* is given. The plant is considered native in the place where found.—*K. M. Wiegand.*

1745. Matsuda, Sadahisa. **A list of plants collected by I. Yamazuta on Mt. Omei.** Bot. Mag. Tôkyô 33: 130–137, 143–152. 1919.—Mt. Omei is one of the famous mountains of China, and is situated about 103° 41′ E. long. and 29° 32′ N. lat. and rises to a height of 11,000 feet above sea level. Thirty-four genera and 76 species of spermatophytes, and 2 genera and 3 species of pteridophytes are listed. The new species and varieties are: *Rubus chroosepalus* var. *omiensis*, *Aster yamazutae*, and *Trigonotis omeiensis.*—*L. R. Abrams.*

1746. Meyer, Rudolf. **Echinopsis Mieckleyi R. Mey.** Monatsschr. für Kakteenkunde 28: 122–124. 1918.—The new species here published appears to be native of South America having been originally imported along with other cactus material from Bolivia.—*J. M. Greenman.*

1747. Monckton, Horace W. **The flora of the Bagshot District.** Jour. Botany 57: 251–257. 1919.—The author has made a practice of noting the plants which he has seen growing on various geological formations, and has attempted to make complete lists of the flora of certain selected geological areas. The district of the Bagshot Sands, on and around the Bagshot Heaths (in England), is the area taken for the present report. It is 24 by 11 miles

in extent and is of a single geological formation. The surface is of sand and gravel with subordinate beds of clay or sandy clay, and there is an absence of lime in the area. A note on the flora of this region has already been published by the author (Proc. Linn. Soc. p. 5, 1915–1916: see Jour. Bot. p. 94, 1916). Eight hundred fifty-four entries in the list have now been made. The present paper contains a discussion of the occurrence of various plants (20–30) from this list, and a comparison with the occurrence elsewhere. A list of the species of *Sphagnum* found in the district is given and the various stations are cited.—*K. M. Wiegand.*

1748. Moore, Spencer Le M. **Alabastra Diversa.—Part XXXI.** Jour. Botany **57**: 244–251. 1919.—1. Miscellanea Africana. (concluded from p. 219). Only new species are treated. In this installment the following are described as new: *Buchnera Kassneri*, Belgian Congo; *Rhamphicarpa Elliotii*, East Africa; *Streptocarpus Eylesii*, Rhodesia; *Justicia* (§ *Harniera*) *Dinteri*, Southwest Africa; *Dicliptera Batesii*, South Cameroons; *Lippia Gossweileri*, Angola; *Clerodendron lupakense*, *C. bingaense*, *C. frutectorum*, and *C. consors*, Belgian Congo; *Loranthus* (§ *Erectilobi*) Batesii Moore & Sprague, Cameroons; *Acalypha eriophylloides*, Angola; *A. Gossweileri*, Angola. 2. Monimiacea Nova Brasiliensis. *Mollinedia* (§ *Inappendiculata*) *Cunninghamii*, from Rio Janeiro, is described as new. [See also Bot. Absts. 3, Entry 3003.] —*K. M. Wiegand.*

1749. Nelson, James C. **Notes on the grasses of Howell's flora of Northwest America.** Torreya 19: 187–193. 1919.—Howell's Flora, although a work of great merit in view of the author's limitations, is now in great need of revision. One hundred and thirty-eight changes affecting the nomenclature of the Gramineae are noted, grouped as follows: (1) Species not included which have since been found in various localities in Oregon, 43; (2) species whose existence in the territory is not confirmed. 10; (3) species whose taxonomic limits are now generally understood differently, 83.—*J. C. Nelson.*

1750. Nelson, J. C. **Oregon Chenopodiums.** Amer. Bot. **25**: 112. 1919.

1751. Nelson, J. C. **Deam's trees of Indiana.** [Rev. of: Deam, Chas. C. **The trees of Indiana.** State Bd. Forest. Indiana Bull. 3. *299 p.* March, 1919.] Rhodora **21**: 188–191. 1919.—See Bot. Absts. 4, Entry 454.

1752. Nordberg, Arne. **Ny fyndort for Cypripedium.** [**A new locality for Cypripedium.**] Bot. Notiser **1919**: 167. 1919.—See Bot. Absts. 4, Entry 358.

1753. Pammel, L. H. **The willows and poplars of Iowa.** Rept. Iowa State Hortic. Soc. 53: 163–173. *12 pl.* 1918.—The author gives a key to the poplars and willows of Iowa. (The key for willows is supplied by C. R. Ball, and is based on foliage character and distribution of the same in the state.) The following willows are recorded for Iowa: *Salix lucida*, *S. pentandra*, *S. alba*, *S. fragilis*, *S. babylonica*, *S. amygdaloides*, *S. nigra*, *S. interior*, *S. cordata*, *S. missouriensis*, *S. pedicellaris hypoglauca*, *S. candida*, *S. petiolaris*, *S. sericea*, *S. discolor*, *S. eriocephala*, *S. humilis*, *S. tristis*, *S. Bebbiana*. Of the species listed *S. pentandra*, *S. fragilis*, *S. babylonica*, and *S. alba* are frequently cultivated. The *S. alba* is a frequent escape. The following poplars are native or naturalized: *Populus alba*, *P. candicans*, *P. balsamifera*, *P. nigra dilatata*, *P. deltoides*, *P. grandidentata* and *P. tremuloides.*—*L. H. Pammel.*

1754. Pammel, L. H. **Some notes on plants of the proposed Mississippi Valley national park.** Rept. Iowa State Hortic. Soc. 53: 379–382. 1918.—A list of the common trees, shrubs and other plants found in the region. Of the rarer trees of Iowa mention is made of *Fraxinus americana*, *Quercus acuminata*, *Betula lutea* and *B. papyrifera.*—*L. H. Pammel.*

1755. Pittier, H. **On the origin of chicle with descriptions of two new species of Achras.** Jour. Washington [D. C.] Acad. Sci. 9: 431–438. 1919.—It has been commonly reported that the sole producer of chicle, the base of American chewing gum, is *Achras Zapota* L., an important fruit tree of Central and South America; but the author recently discovered, during an official exploration through Central America, that chicle is not extracted exclusively, if at

all, from *A. Zapota*, but from other species of the genus and from other genera of the same family, Sapotaceae. Under the genus *Achras*, which has previously been considered monotypic, two new species are described.—*Helen M. Gilkey.*

1756. Pugsley, H. W. **A revision of the genera Fumaria and Rupicapnos.** Jour. Linn. Soc. Bot. London 44: 233–355. *Pl. 9–16.* 1919.—A critical revision of all species of *Fumaria* and *Rupicapnos*, with a general discussion of the distribution and habitats of the genera as a whole. A few notes on soil preference are given. In *Fumaria* 7 new species and 18 new varieties are described, and in *Rupicapnos*, 7 new species and 2 new varieties.—*A. J. Eames.*

1757. Purpus, J. A. **Phyllocactus (Epiphyllum) chiapensis J. A. Purp. spec. nov.** Monatsschr. für Kakteenkunde 28: 118–121. 1918.—*Phyllocactus chiapensis* is described and illustrated as new to science from specimens collected by C. A. Purpus in the state of Chiapas, Mexico, in 1913.—*J. M. Greenman.*

1758. Rehder, Alfred. **New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum.** Jour. Arnold Arboretum 1: 44–60. July, 1919.—After an introduction discussing some doubtful points of nomenclature chiefly as regards articles 45, 47 and 50 of the International rules and the nomenclature of varieties and hybrids, a systematic enumeration of new species and new combinations is given. *Taxus chinensis* (Pilger) and *Carpinus Handelii* are new species from China, *Larix Henryana* is a new name for a hybrid between *L. decidua* and *L. Kaempferi.* The following are new combinations: *Pseudolarix amabilis* (J. Nelson), *Abies spectabilis* var. *brevifolia* (A. Henry), *Sasa Veitchii* (Carr.), *S. Veitchii* f. *minor* (Makino), *S. senanensis* (French. & Sav.), *S. senanensis* f. *nebulosa* (Makino) and *S. senanensis* var. *stenantha* (Makino). Besides these many new combinations of horticultural forms and varieties appear under the following species: *Cupressus lusitanica*, *Chamaecyparis obtusa*, *Abies homolepis*, × *A. insignis*, *A. alba*, *A. lasiocarpa*, *Picea Abies*, *P. glauca*, *Betula pendula.* For the Chinese *Carya cathayensis* a new station is recorded. [See also next following Entry, 1759.]—*Alfred Rehder.*

1759. Rehder, Alfred. **New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum.** Jour. Arnold Arboretum 1: 121–146. 1919.—The present article contains new combinations and some new names in the genera *Castanopsis*, *Lithocarpus*, *Quercus*, *Ulmus*, *Calycanthus* and *Benzoin*, critical notes on *Quercus dentata*, *Zelkowa serrata*, *Litsea sericea* and on the nomenclature of *Ulmus procera*, a new horticultural form and a new binomial for a garden hybrid of *Mahonia*, and the following new varieties and forms: *Quercus aliena* var. *pubipes*, *Ulmus laciniata* var. *nikkoensis*, *U. pumila* var. *pilosa*, *Morus mongolica* var. *vestita* and *Umbellularia californica* f. *pendula.* [See also next preceding Entry, 1758.]—*Alfred Rehdet.*

1760. Rehder, Alfred, and E. H. Wilson. **New woody plants from the Bonin Islands.** Jour. Arnold Arboretum 1: 115–121. 1919.—The following species and one variety are described as new to science: *Cyphokentia Savoryana*, *Ficus Iidaiana*, *Evodia Kumagaiana*, *Symplocos Otomoi*, *S. boninensis* and *Zanthoxylum ailanthoides* var. *inerme.* A new combination is *Calpidia Nishimurae* (*Pisonia Nishimurae* Koidzumi).—*Alfred Rehder.*

1761. Robinson, B. L. **An unusual Daucus Carota.** Rhodora 21: 70–71. 1919.—Description of an unusual specimen of this species in which nearly half of the compound umbel has petals of a rich, deep violet shade.—*James P. Poole.*

1762. Robinson, B. L. **I. On tropical American Compositae, chiefly Eupatorieae.** [Contrib. Gray Herb. Harvard Univ. New Ser. 60: 1–88.] Proc. Amer. Acad. Arts and Sci. 55: 3–41. 1919.—The following species, varieties and forms new to science are characterized: *Ophryosporus bipinnatifidus*, *O. ovatus*, *Eupatorium anisodontum*, *E. Aristei*, *E. Bridgesii*, *E. choricephaloides*, *E. coelocaule*, *E. Cookii*, *E. dasyneurum*, *E. drepanoides*, *E. endytum*, *E. eripsimum*, *E. flexile*, *E. Gascae*, *E. Gilbertii*, *E. gloeocladum*, *E. gracilentum*, *E. hylophilum*, *E.*

hypargyrum, E. iodotrichum, E. iresinoides HBK. var. *adenotrichum, E. isillumense, E. lobatum, E. mallotum, E. mallotum* Robinson var. ? *aporum, E. Mathewsii, E. metense, E. orgyaloides, E. Pachanoi, E. phoenicticum, E. pseudodalea* (DC.) Gomez & Molt. var. *typicum, E. pseudodalea* (DC.) Gomez & Molt. var. *apodophyllum, E. pseudo-dalea* (DC.) Gomez & Molt. var. *macrodontum, E. psilodorum, E. rhypodes, E. Roseorum, E. roupalifolium, E. simulans, E. solidaginoides* HBK. var. *Armourii, E. Sprucei, E. squalidum* DC. var. *Rusbyanum, E. Steetzii, E. stictophyllum, E. tarapotense, E. uber, E. urubambense, E. vallincola* DC. var. *typicum, E. vallincola* DC. var. *brevipilum, Brickellia ? Arsenei, Calea caracasana* (HBK.) Ktze. var. *pilosior* Ktze. forma *discoidea*. **II. A Recension of the Eupatoriums of Peru.** *Ibid.* 42–88. The author gives keys to the 82 species known to occur in Peru. Exsiccatae and synonyms are cited and many diagnoses and critical notes are given. The following new combinations (with the name-bearing synonym in parentheses) are made: *Eupatorium exserto-venosum* Klatt, var. *crenatum* (*E. pseudofastigiatum* var. *crenata* Hieron.), *E. exserto-venosum* Klatt. var. *crenato-dentatum* (*E. pseudofastigiatum* var. *crenato-dentata* Hieron.), *E. exserto-venosum* Klatt, var. *lanceolatum* (*E. pseudofastigiatum* var. *lanceolatum* Hieron.), *E. kleinioides* HBK. var. *typicum* (*E. kleinioides* forma *typica* Hieron.), *Helogyne straminea* (*Eupatorium stramineum* DC.).—*E. B. Payson.*

1763. Rock, J. F. **The arborescent indigenous legumes of Hawaii.** Hawaii Bd. Agric. and Forest. Div. Forest. Bot. Bull. 5. *53 p. Pl. 1–18.* 1919.—The author gives botanical descriptions and notes on various species and varieties of indigenous Hawaiian legumes included under the following genera: *Acacia, Mezoneurum, Sophora,* and *Erythrina.*—*J. M. Westgate.*

1764. Rock, J. F. **The Hawaiian genus Kokia, a relative of the cotton.** Hawaii Bd. Agric. and Forest. Div. Forest. Bot. Bull. 6. *22 p. Pl. 1–7.* 1919.—Botanical and historical notes are given concerning *Kokia lanceolata, K. Rockii,* and *K. Rockii* var. *kauaiensis* n. var., together with a description of measures looking to the preservation to science of these rare trees because of their possible importance in relation to the solution of cotton-breeding problems.—*J. M. Westgate.*

1765. Russell, Alice M. **A comparative study of Floerkea proserpinacoides and allies.** Contrib. Univ. Pennsylvania Bot. Lab. 4: 401–418. *Pl. 91–92.* 1919.—See Bot. Absts. 3, Entry 2444.

1766. Sargent, C. S. **Notes on North American trees. V.** Jour. Arnold Arboretum 1: 61–65. July, 1919.—The present article deals with *Populus* and *Betula.* The author adopts *Populus tacamahaca* Mill. for *P. balsamifera* of authors, not Linnaeus, and *P. balsamifera* L. for *P. deltoidea* var. *missouriensis* Henry (*P. angulata* Michx.) with the variety *P. balsamifera* var. *virginiana* (Castiglioni) for *P. deltoidea* Marsh. Besides the last named the following varieties and combinations are published as new: *Populus acuminata* var. *Rehderi, P. Fremontii* var. *macrodisca, P. balsamifera* f. *pilosa, Betula papyrifera* var. *elobata* (Fernald), *B. papyrifera* var. *occidentalis* (Hook.), *B. papyrifera* var. *subcordata* (Rydberg), *B. papyrifera* var. *montanensis* (Butler), *B. fontinalis* var. *Piperi* (Britton).—*Alfred Rehder.*

1767. Schlechter, R. **Versuch einer natürlichen Neuordnung der afrikanischen angraekoiden Orchidaceen.** [**A proposed natural new arrangement of the African angraecoid Orchidaceae.**] Beih. Bot. Centralbl. 35^{II}: 62–181. 1918.—The African angraekoid orchids are arranged in 32 genera. Of these, 12 are new: *Rhipidoglossum, Podangis, Phormangis, Sarcorhynchus, Bolusiella, Chamaeangis, Solenangis, Eurychone, Cephalangraecum, Crossangis, Oconiella* and *Bathiea.* The number of species presented in the 32 genera totals 361, of which 86 are placed in the genus *Angraecum* itself. Many new combinations are introduced in the nomenclature of species.—*Earl E. Sherff.*

1768. Schlechter, R. **Kritische Aufzählung der bisher aus Zentral-Amerika bekanntgewordenen Orchidaceen.** [**Critical enumeration of the known orchids of Central America.**] Beih. Bot. Centralbl. 36^{II}: 321–520. 1918.—One hundred pages (p. 421–520) are occupied with

a taxonomic arrangement of the known genera and species of orchids from Central America (including Mexico). The 132 genera are arranged in 36 groups, beginning with the *Cypripedilinae* and ending with the *Sarcanthinae*. An extensive synonymy is given throughout. A list of 11 names for Mexican species all described originally by La Llave and Lexarza (Nov. Veg. 2. 1825) is appended; the application of these names to their respective species has not been settled. Preceding the taxonomic arrangement is a detailed historical résumé of earlier collecting of orchids in Central America and Mexico, from the Spanish physician F. Hernandez (Mexico, 1571–1577) down to A. Tonduz, Wercklé, Biolley, H. Pittier, W. R. Maxon, C. A. Purpus. Mrs. Rousseau, etc. of the present century. The geographic area embraced in the study extends, approximately, from 33° to 9° north latitude and from 80° to 115° west longitude. Separate discussions are given for Mexico, British Honduras, Guatemala, etc. The Mexican flora is referred to four main regions—the warm, the temperate, the arid-temperate (die Kakteenreichen, tempericirten Regionen) and the cold. The arid-temperate region has very few orchids.. Mexico has a total of 92 genera of orchids. Tables are given showing the relative degree of endemism in each genus. An astonishingly large number of the species, namely 482, or almost four-fifths of the total, are endemic in Mexico. Furthermore, 66 of the remaining species are restricted to Central America, never having been found elsewhere. Only 3 genera (*Erycina*, with 3 species, and *Papperitzia* and *Mormolyce*, each with 1 species) are endemic in Mexico. Mexico and South America have 41 species common to both. Of the orchid flora of British Honduras, Honduras and San Salvador, very little is known. In Guatemala, 84 genera are present. Of these species, 207 are endemic in Guatemala and 92 others are endemic in Central America. Nicaragua's orchid flora is not well known. It has, however, 32 genera; 20 species are endemic in Nicaragua, and 18 others endemic in Central America. Costa Rica is rich in orchids, having 91 genera; 285 species are endemic in Costa Rica and 62 others endemic in Central America. Panama has 54 genera, with 65 species endemic in Panama and 34 others endemic in Central America. Only 5 Panama species are identical with those from the West Indies, but there are 17 Panama species, or about one-seventh of the total, that are identical with South American species.—A table is given showing the species-distribution for each genus in each country studied. Of the 1325 species embraced in the 132 genera, 628 are found in Mexico, 8 in British Honduras, 338 (366 ? —loc. cit., p. 343) in Guatemala, 18 in Honduras, 13 in San Salvador, 57 in Nicaragua, 396 in Costa Rica, 117 in Panama. Relationships of the Central American and Mexican orchids to those of other lands are discussed. A new genus, *Epilyna*, is described. There are also detailed Latin descriptions of 85 new species. These all are included in the taxonomic synopsis that closes the article.—*Earl E. Sherff.*

1769. Schneider, Camillo. **Notes on American willows. V. The species of the Pleonandrae group.** Jour. Arnold Arboretum 1: 1–32. July, 1919.—The present article deals with the American species of *Salix* belonging to the *Pleonandrae* group which comprises the sections *Nigrae*, *Triandrae*, *Pentandrae* and *Bonplandianae*. Twelve species and several varieties are enumerated and their distribution, relationship and nomenclature discussed at length. One species and one form are described as new: *Salix Harbisonii* (*S. marginata* Small, not Wimmer) and *S. amygdaloides* f. *pilosiuscula*.—*Alfred Rehder.*

1770. Schneider, Camillo. **Notes on American willows. VI.** Jour. Arnold Arboretum 1: 67–97. 1919.—The présent article deals with the section *Phylicifoliae* including 10 species, the section *Sitchenses* with 2 and the new section *Brewierianae* also with 2 species. The following new species, new varieties and forms are proposed: *Salix pulchra* var. *yukonensis*, *S. planifolia* var. *monica* (*S. monica* Bebb), *S. pellita* f. *psila*, *S. Jepsonii*, *S. Coulteri* f. *parvifolia* and *S. delnortensis*. [See also Bot. Absts. 3, Entries 1838, 1839.]—*Alfred Rehder.*

1771. Schonland, S. **Klingia, a new genus of Amaryllidaceae.** Rec. Albany Mus. [Grahamstown, South Africa] 3: 178–181. *Fig. 1–2.* 1919.—This is a description of a new genus from Namaqualand. It is closely allied to *Gethyllis*.—*E. P. Phillips.*

1772. St. John, Harold. **Phanerotaenia, a new genus of Umbelliferae.** Rhodora 21: 181–183. 1919.—In a study of the genus *Polytaenia* the writer found such fundamental differences in the structure of the fruits of *P. Nuttallii* DC. and its variety *texana* C. & R. as to warrant their separation into two distinct genera. He, therefore, proposes the new generic name *Phanerotaenia* for the variety which now becomes *Phanerotaenia texana* (C. & R.) *n. comb.* The differences between this plant and the genera with which it might be confused are given, also the description and the geographical distribution in United States.—*James P. Poole.*

1773. Standley, Paul O. **A neglected Solidago name.** Rhodora 21: 69–70. 1919.—Author takes up *Solidago suaveolens* Schoepf, for *S. odora* Ait. Citation of the literature giving the earlier name.—*James P. Poole.*

1774. Taylor, Norman. **Britton and Rose's Cactaceae.** [Rev. of: Britton, N. L., and J. N. Rose. **The Cactaceae. Descriptions and illustrations of plants of the Cactus family.** *Vol. 1. pp. 1–236. Plates 1–36, fig. 1–303.* Carnegie Inst. Washington, Publ. No. 248. June 21, 1919.] Torreya 19: 200–203. 1919.—This book is the most thorough treatment of the systematic botany of the cactus family that has yet appeared. The first volume discusses *Opuntia* and its segregates, and *Pereskia. Opuntia* proper contains 254 species, as contrasted with 162 in Schumann's Gesamtbeschreibung der Kakteen (1903). The volume embodies the results of recent exploration by the authors and many others in the Western Hemisphere. In addition to the descriptions and notes on distribution and relationship, complete synonymy is given, together with a wealth of illustrative photographs and drawings. Many prevalent errors as to distribution and specific limits are corrected. Three great cactus-regions are distinguished: (1) Southwestern United States and adjacent Mexico; (2) Mexico and Central America; (3) Argentine, including Paraguay, Uruguay and Chile. Only 56 species of *Opuntia*, mostly endemic, are found in the intervening regions. The work is incomparably the best on the subject that has yet appeared.—*J. C. Nelson.*

1775. Urban, I. **Sertum antillanum V, VI.** [An account of Antillean plants.] Rep. Sp. Nov. 15: 156–171, 305–323. 1918.—In continuation of his studies on the West Indian flora the author has published the following new species and combinations of flowering plants: *Stelis Desportesii, Piper Oviedoi, Ficus Plumerii* (*F. citrifolia* Lam., not Mill.), *Gyrotaenia crassifolia* (*Urera crassifolia* Wedd.), *Urera domingensis, U. ovatifolia, Pilea cyclophora, P. parietaria* (L.) Bl. var. *hispaniolensis, P. Minguetii, P. caulescens* (*Dorstenia caulescens* L.), *P. Tippenhaueri, Phenax urticifolius* (*Procris urticaefolia* Poir.), *Leptogonum Buchii, Alternanthera peploides* (*Illecebrum peploides* H. & B.), *Pisonia brevipetiolata* (*P. discolor* Spreng. var. *brevipetiolata* Heimerl.), *Clematis barahonensis, Nectandra oligoneura, Bombax Tussacii, Eleutherine bulbosa* (*Sisyrinchium bulbosum* Mill.), *Spiranthes quinquelobata* (*Ophrys quinquelobata* Poir.), *Tetramicra canaliculata* (*Limodorum canaliculatum* Aubl.), *Oncidium maculatum* (*Epidendrum maculatum* Aubl.), *Dendrophylax varius* (*Orchis varia* J. F. Gmel), *Talauma dodecapetala* (*Anona dodecapetala* Lam.), *Inga edulis* Mart. var. *grenadensis, Mimosa tobagensis, Cassia Gundlachii, C. arduinervis, C. pinetorum* (*Chamaecrista pinetorum* Britton), *C. pinetorum* var. *Picardae, C. selleana, C. exunguis, C. brachycarpa, C. martinicensis, Caesalpinia Rosei, Dalbergia Berterii* (*Ecastaphyllum Berterii* DC.), *Machaerium tobagense, Canavalia Ekmani, Rhynchosia pyramidalis* (*Dolichos pyramidalis* Lam.), *R. Swartzii* (*Dolichos Swartzii* Vail), *Hyptis americana* (*Nepeta americana* Aubl.), *Blechum pyramidatum* (*Barleria pyramidata* Lam.), and *Ceratosanthes palmata* (*Trichosanthes palmata* L.).—*J. M. Greenman.*

1776. Urban, I. **Über zwei Euphorbiaceen-Gattungen.** [On two Euphorbiaceous genera.] Ber. Deut. Bot. Ges. 36: 501–507. *Pl. 16.* 1919.—*Cubincola* is described and illustrated as a new genus of the Euphorbiaceae and is based on specimens collected in Cuba by Charles Wright in 1861. The author also presents a brief discussion of the genus *Leucocroton* Griseb. —*J. M. Greenman.*

1777. Weatherby, C. A. Long pond. Rhodora 21: 73–76. 1919.—See Bot. Absts. 4, Entry 370.

1778. Weingart, Wilhelm. Rhipsalis Purpusii spec. nov. Monatsschr. für Kakteenkunde 28: 78–82. 1918.—*Rhipsalis Purpusii* is described and illustrated as new to science. The species was discovered in the state of Chiapas, Mexico, by C. A. Purpus to whom it is dedicated.—*J. M. Greenman.*

1779. Woodward, R. W. Two Festuca varieties. Rhodora 21: 72. 1919.—Note in regard to two varieties of Festuca, *F. ovina* var. *hispidula* and *F. rubra* var. *subvillosa*, and their occurrence in Franklin, Connecticut.—*James P. Poole.*

1780. Youngken, Heber Wilkinson. The comparative morphology, taxonomy and distribution of the Myricaceae of the eastern United States. Contrib. Univ. Pennsylvania Bot. Lab. 4: 339–400. *Pl. 81–90.* 1919.—See Bot. Absts. 3, Entry 2458.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

Burton E. Livingston, *Editor*

1781. Alexander, W. P. The tamarack, American larch. Nat. Study Rev. 15: 15–17. 1919.

1782. Anonymous. New Jersey peat industry in 1918. Jour. Amer. Peat Soc. 13: 81. 1920.—New Jersey stands first in the United States in peat production. The value of New Jersey peat was $264,822 in 1918.—*G. B. Rigg.*

1783. Anonymous. [Rev. of: Miss M. Rathbone's paper before the Linnaean Society, on "Preserving specimens in formalin."] Jour. Botany 57: 135. 1919.

1784. Anonymous. The Iceland poppy. Gard. Chron. Amer. 23: 162. *Fig. 1.* 1919.

1785. Anonymous. Plants of the Bible and Biblical lands. South African Gard. and Country Life 9: 206. 1919.

1786. Anonymous. Plants of the Bible and Biblical Lands. South African Gard. and Country Life 9: 303–304. *2 fig.* 1919.

1787. Anonymous. Memorial fruit trees for France. Brooklyn Bot. Gard. Rec. 8: 150. Oct., 1919.—New York [City] Bird and Tree Club, coöperating directly with the French government, has inaugurated a campaign for funds to replant destroyed orchards in the devastated regions of France.—*C. S. Gager.*

1788. Anonymous. Peat as an ingredient of feeds. Jour. Amer. Peat Soc. 12: 183–184. 1919.—Peat has been used as an ingredient of stock feeds at the Texas Agric. Exp. Sta. If used in small amounts this ingredient is beneficial in about the same way that charcoal is. It has also been used in England.—*G. B. Rigg.*

1789. Anonymous. Peat fuel industry in Europe. Jour. Amer. Peat Soc. 12: 211. 1919. —The use of peat as a substitute for coal has recently been greatly extended in Austria, Switzerland and Denmark.—*G. B. Rigg.*

1790. Anonymous. Peat fiber in Germany during the war. Jour. Amer. Peat Soc. 12: 214–215. 1919.—A mixture of 50 per cent peat fiber and 50 per cent wool makes a strong durable material that looks well and is suitable for men's clothing. The cost of producing the fiber is high.—*G. B. Rigg.*

1791. Anonymous. **Peat as fuel on Swedish railways.** Jour. Amer. Peat Soc. 12: 210. 1919.—Powdered peat is being used as fuel on some locomotives on Swedish railways. As fired it gives 7780 British thermal units per ton. Its use will not be economical when coal is less than $11 per ton.—*G. B. Rigg.*

1792. Anonymous. **California delta farms.** Jour. Amer. Peat Soc. 12: 991–201. 1919.—Several thousand acres of tule-covered peat lands near Stockton, California, are being brought into cultivation.—*G. B. Rigg.*

1793. Anonymous. **U. S. peat industry in 1918.** Jour. Amer. Peat Soc. 12: 185–187. 1919.—Over $1,000,000 worth of peat and peat products were produced in the U. S. in 1918. The chief uses of peat in this country at present are (1) fuel for the production of heat and power, (2) fertilizer, (3) stable litter, (4) stock feed, (5) packing, (6) surgical dressings, (7) agricultural utilization of peat lands. The production of peat fuel in the New England states is increasing rapidly.—*G. B. Rigg.*

1794. Anonymous. **Lithuania peat deposits.** Jour. Amer. Peat Soc. 12: 220. 1919.

1795. Anonymous. **Rattan—its source and its services.** Sci. Amer. 121: 7. 1919.

1796. Anonymous. **Lily leaves as rafts.** Sci. Amer. 121: 61. 1919.

1797. Anonymous. **Fuller's earth.** Sci. Amer. 121: 149. 1919.

1798. Anonymous. **The possibilities of peat.** Sci. Amer. 121: 80. 1919.

1799. Anonymous. **Novel leaf prints.** Sci. Amer. Supplem. 88: 89. 1919.

1800. Anonymous. **Flowers and tiny animals in glass.** Sci. Amer. Supplem. 87: 296–297. *6 fig.* 1919.—A brief account of glass-blowing of models at the American Museum of Natural History.—*Chas. H. Otis.*

1801. Anonymous. **Insulators from kelp.** Sci. Amer. 121: 335. 1919.—*Macrocystis* can be made to yield a moist precipitate which can be pressed into any required shape and hardened by treatment with formalin, when it turns perfectly in the lathe and takes a high polish. —*Chas. H. Otis.*

1802. Anonymous. **Wood alcohol—a new industrial monarch.** Sci. Amer. 121: 462. *3 fig.* 1919.—Possible sources of industrial alcohol mentioned are wood, molasses, the Nipa palm (in the Far East, India, Africa, etc.), the agave (Mexico), gum turpentine and various fruits and vegetables.—*Chas. H. Otis.*

1803. Anonymous. **The century plant in Mexico.** Sci. Amer. Supplem. 87: 313. *2 fig.* 1919.—The sap of the agave is the source of the national Mexican intoxicants, pulque and mescal; an extract of the leaves is employed as a substitute for soap, and they also yield a fiber which is second to only sisal and hemp in rope making.—*Chas. H. Otis.*

1804. Anonymous. **Vegetarian beef extract.** Sci. Amer. 121: 191. 1919.—Yeasts, which are a by-product in the manufacture of ethyl or grain alcohol, may be made to yield a cattle food, are valuable as fertilizers and have infinite possibilities as human food.—*Chas. H. Otis.*

1805. Anonymous. [Rev. of Rhodes, L. B. **A new seed oil from cockle burr.** Amer. Chem. Soc. News Service Bull. 231. 1919.] Jour. Franklin Inst. 187: 744. 1919.

1806. Behre, A. **Nach welcher Richtung ist eine Ergänzung oder Abänderung der Richtlinien B der Bekanntmachung vom 8. April 1918, betr. Grundsätze für die Erteilung oder Versagung der Genehmigung von Ersatzlebensmitteln wünschenswert?** [Approbation of food substitutes.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel. 37: 238–255. 1919.

1807. Beythien, A. **Ist die Ausdehnung der Ersatzmittelüberwachung auf Wasch-, Bleich-, Scheuer- und sonstige Reinigungsmittel sowie auf Ersatzmittel für Wäsche-Stärke erforderlich? [Regulation of substitute bleaching and scouring materials and washing starch.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 344–370. 1919.

1808. Britton, N. L. **Report of the Secretary and Director-in-Chief** [New York Bot. Gard.] **for the year 1918.** Bull. New York Bot. Gard. 10: 1–87. 1919.

1809. Burkill, I. H. **Twin nutmeg seeds.** Gardens' Bull. Straits Settlements 2: 158. 1919.

1810. Burt, Adena K. **The balsam fir.** Nat. Study Rev. 15: 27–31. 1919.

1811. Correa, M. Pio. **Fibras Texteis e Cellulose. [Textile fibers and cellulose.]** *276 p., 70 fig., 7 diagrams.* Rio de Janeiro, 1919.—After a general introduction regarding the fiber plants of Brazil, including those for which the conditions in Brazil are regarded as favorable, and especially plants which may yield fiber suitable for paper stock, detailed information, including botanical and common names and synonyms, is given regarding the following species:—piteira gigante, *Furcraea gigantea*; juta, *Corchorus capsularis* and *C. olitorius*; gravatá de rede, *Ananas bracteatus*; gravatá de gancho, *Bromelia karatas*; canhamo, *Cannabis sativa*; guaxima roxa, *Uena lobata*; guaxima do mangue, *Hibiscus tiliaceus*; papoula do Francisco, *Hibiscus cannabinus*, and notes relating to less important species. It is the most comprehensive work that has been published thus far regarding the fiber-producing plants of any portion of South America.—*L. H. Dewey.*

1812. Fletcher, G. **The industrial peat problem in Ireland.** Jour. Amer. Peat Soc. 12: 205–208. 1919.—In Ireland, since coal is expensive, producer gas can be made from peat more cheaply than from coal. Nitrogen is recovered in the form of ammonium sulphate as a by-product.—*G. B. Rigg.*

1813. Fultz, F. M. **Flower camouflage. Peculiarities of some wild flowers of southern California.** Sci. Amer. Supplem. 88: 8–9. *5 fig.* 1919.

1814. Gardner, H. A. **Legitimization of soya bean oil.** Sci. Amer. 121: 196. 1919.—Concerns the use of soya bean oil in paints and varnishes.—*Chas. H. Otis.*

1815. Grandcourt, Genevieve. **Eternal youth as a scientific theory.** Sci. Amer. 121: 482, 490, 500. 1919.—A discussion of the place which Voronoff's thesis occupies in the general field of human interest.—*Chas. H. Otis.*

1816. Heritage, J. P. **Is alcohol dead?** Sci. Amer. Supplem. 88: 242–243, 256. 1919.—An article treating, among other considerations, of the various plant sources of alcohol and the cost of manufacture from the different sources.—*Chas. H. Otis.*

1817. Hindshaw, H. H. **Logical methods of utilization of Minnesota peat.** Jour. Amer. Peat Soc. 13: 37–44. 1920.—Modern methods of handling and treating increase the value of peat for various forms of fuel.—*G. B. Rigg.*

1818. Hitchens, Alfred B. **Modern applications of photography.** Jour. Franklin Inst. 187: 129–146. *Fig. 1–13.* 1919.—A peculiar résumé of the subject including descriptions of several biologic applications.—*Ernest Shaw Reynolds.*

1819. Howe, H. E. **Tobacco stems.** Sci. Amer. 121: 162, 168. 1919.

1820. Juckenack, A. **Kennzeichnung der früher als alkoholfreier Punsch, Grog, Likör u. dergl. in dem Verkehr gelangten Getränke. [Alcohol-free punch, etc.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 37: 220–238. 1919.

1821. Leadbeater, J. W. **Decolorizing carbon.** Jour. Amer. Peat. Soc. 12: 222. 1919. —British patent 122698 (Jan. 31, 1918) covers a method of preparing decolorized carbon from peat.—*G. B. Rigg.*

1822. MacMurray, Nell. **Elder blossoms.** Amer. Bot. 25: 66. 1919.

1823. Marie-Victorin, Fr. des E. C. **Toxicité de la prêle des champs. [Toxicity of field horsetail (Equisetum arvense L).]** Naturaliste Canadien 46: 148–151. Jan., 1920.—The author presents evidence to show that *Equisetum arvense* L., together with *E. sylvaticum* L., *E. fluviatile* L. and *E. hyemale* L., have proved poisonous to horses, especially on the low clay banks of the St. Lawrence river. About May, 1919, five horses showed symptoms of cerebro-spinal meningitis apparently due to horse-tail poisoning. He gives descriptions of symptoms by Friedberger and Frohner, and by Prof. Jones and Dr. Rich. Young horses succumb more readily than old ones and those fed on grain show greater resistance than others. The old, dry plants eaten with hay are especially toxic. The symptoms are described as *equisetosis*. [See also Bot. Absts. 4, Entry 1840.]—*A. H. MacKay.*

1824. Mattle, P. A. **The Swiss mountain pine.** Nat. Study Rev. 15: 1–5. 1919.—Description of scenery.

1825. Nageotte, J. **Organic matter and life.** Sci. Amer. Supplem. 87: 362–363. 1919. [Translated for the *Scientific American Supplement*; source not stated.]

1826. Ott, E. **Gas from peat.** Jour. Amer. Peat Soc. 12: 210–211. 1919.—Owing to their comparatively high oxygen content and low carbon content, wood and peat, when subjected to destructive distillation, yield a gas containing a high proportion of carbon dioxide and consequently a low calorific value. The tars yielded by these substances are hygroscopic. —*G. B. Rigg.*

1827. Pammel, L. H. **The whorled milkweed.** Amer. Jour. Vet. Med. 14: 135–136. 1919. —Two letters are quoted giving details of a case of sheep poisoning in Colorado by the whorled milkweed, identified by the author as *Asclepias verticillata*. The letters state that potassium permanganate, given hypodermically, was used as a remedy. The remainder of the article is material from Colorado Agric. Exp. Station Bull. 246. [See also next following Entry, 1828.]—*C. D. Marsh.*

1828. Pammel, L. H. **Whorled milkweed.** Amer. Jour. Vet. Med. 14: 514. 1919.—After a note on the newspaper reports of whorled milkweed as a poison to stock in Colorado, a list is given of Iowa localities for *Asclepias verticillata*. The plant is found at Minneapolis and St. Paul, LaCrosse (Wisconsin), and Yankton (South Dakota), as well as in Colorado. [See also next preceding Entry, 1827.]—*C. D. Marsh.*

1829. Pammel, L. H. **Frozen beet tops.** Amer. Jour. Vet. Med. 14: 244. 1919.—Three horses died, presumably from eating frozen sugar-beet tops. A short description of the symptoms is given.—*C. D. Marsh.*

1830. Pammel, L. H. **Supposed poisoning from cowbane.** Amer. Jour. Vet. Med. 14: 456. 1919.—A weed sent from Colorado is identified as either *Cicuta maculata* or *C. occidentalis*. The author states that he has fed *Cicuta* roots to horses in summer without injury, but that these roots produce fatalities in the fall or winter. It is supposed that injurious results from feeding this plant are caused by the fresh leaves. Many persons have been poisoned by contact with the plant when perspiring. [See also Bot. Absts. 4, Entry 1834.]—*C. D. Marsh.*

1831. Pammel, L. H. **Fly amanita and boleti.** Amer. Jour. Vet. Med. 14: 514. 1919.—Large numbers of specimens of *Boletus* were seen at an altitude of 11,000 ft. in Colorado. In the same region the fly amanita was numerous and it is suggested that the latter may cause some poisoning of sheep in that region. A description of the fly amanita (*A. muscaria*) follows.—*C. D. Marsh.*

1832. Pammel, L. H. **Poison hemlock.** Amer. Jour. Vet. Med. 14: 513. 1919.—The occurrence of poison hemlock, *Conium maculatum*, is noted for Bellevue (Iowa), Golden (Colorado), and the neighborhood of Salt Lake City. A description of the plant and the symptoms it produces is given.—*C. D. Marsh.*

1833. Pammel, L. H. **Suspected poisonous plant from Arkansas.** Amer. Jour. Vet. Med. 14: 417–418. 1919.—A plant of *Ranunculus abortivus* was sent by a correspondent who thought it might have been the cause of death in cattle. The reply suggests that, while this and other buttercups are acrid, there is no evidence that they poison cattle.—*C. D. Marsh.*

1834. Pammel, L. H. **Poisoning from cowbane.** Amer. Jour. Vet. Med. 14: 419. 1919.—The weed (*Cicuta*) does not produce injury when dried and cured. Warning is given to use gloves when pulling it, as cases of fatal poisoning of human beings have followed contact with the plant. [See also Bot. Absts. 4, Entry 1830.]—*C. D. Marsh.*

1835. Pammel, L. H. **Poisoning from sorghum and Sudan grass.** Amer. Jour. Vet. Med. 14: 30–31. 1919.—A brief discussion of the subject with accounts of cases.—*C. D. Marsh.*

1836. Pammel, L. H. **Sorghum blight.** Amer. Jour. Vet. Med. 14: 189. 1919.—In answer to a query as to whether the red streaks on sorghum cane are connected with its poisonous properties, answer is made that the streaks are due to *Bacillus sorghi* and have nothing to do with the toxicity of the sorghum.—*C. D. Marsh.*

1837. Pammel, L. H. **White snakeroot poisonous in Illinois.** Amer. Jour. Vet. Med. 14: 31. 1919.—Describes the symptoms exhibited by calves poisoned by *Eupatorium urticaefolium* and gives details of the treatment used. The symptoms were considered as diagnostic of trembles or milksickness.—*C. D. Marsh.*

1838. Pammel, L. H. **Pingue poisoning in Arizona.** Amer. Jour. Vet. Med. 14: 32. 1919.—Reports information from Williams, Arizona, of the poisoning of sheep in that neighborhood, and adds some information from other sources. Pingue is the Mexican name for *Hymenoxys floribunda.*—*C. D. Marsh.*

1839. Pammel, L. H. **Deadly nightshade and bitter-sweet.** Amer. Jour. Vet. Med. 14: 192. 1919.—Reports a case of poisoning of a sheep by *Solanum nigrum* and states that the leaves are toxic to animals. The fruit is used for making jams and has little toxicity.—*C. D. Marsh.*

1840. Pammel, L. H. **Poisoning from horsetail.** Amer. Jour. Vet. Med. 14: 245–246. 1919.—Replying to a correspondent who suggest that cerebrospinal meningitis may be produced in horses by *Equisetum arvense*, it is stated that the weed does produce a form of paralysis, but not cerebrospinal meningitis. Statements from Pammel's Manual of poisonous plants are given. [See also Bot. Absts. 4, Entry 1823.]—*C. D. Marsh.*

1841. Pammel, L. H. **Sesban or mole-bean poisonous.** Amer. Jour. Vet. Med. 14: 246. 1919.—A correspondent reported that the mole-bean (*Sesbania platycarpa*) is said to poison cattle in North Carolina. The author says that it belongs to a family containing many poisonous plants, and has previously been suspected of being poisonous.—*C. D. Marsh.*

1842. Pammel, L. H. **Mechanical irritation of some plants.** Amer. Jour. Vet. Med. 14: 307–308. 1919.—*Mucuna pruriens*, *Hordeum jubatum*, *Stipa spartea*, *Stipa comata* and species of *Opuntia*, are mentioned as plants producing mechanical irritation in stock. Brown and Anderson are quoted regarding calcium oxalate crystals in *Arisaema triphyllum* and *Colocasia*, and the acrid principle in *Phytolacca.*—*C. D. Marsh.*

1843. Pammel, L. H. **A little history on ergotism.** Amer. Jour. Vet. Med. 14: 357–358. 1919.—The author had supposed that the outbreak of ergotism in Kansas in 1884 was first correctly diagnosed by Dr. Stalker. Dr. Faville claims, in a letter, to be the first to make the correct diagnosis.—*C. D. Marsh.*

1844. Pammel, L. H. **Cocklebur injurious.** Amer. Jour. Vet. Med. 14: 358. 1919.—A brief statement is made of the conjectures in regard to poisoning by cocklebur—species of *Xanthium*.—*C. D. Marsh.*

1845. Pammel, L. H. **Forage poisoning.** Amer. Jour. Vet. Med. 14: 360. 1919.—In reply to question as to whether crab-grass smut (*Ustilago rabenhorstiana*) might have been the cause of deaths of cattle, reply is made that the smut is not strongly toxic, and that the deaths were probably produced by sorghum or some other toxic plant.—*C. D. Marsh.*

1846. Pammel, L. H. **Loco weed and salt sage.** Amer. Jour. Vet. Med. 14: 360–361. 1919.—A letter is quoted from Dr. Benoy, of Maxwell, New Mexico, in which are described the symptoms produced in horses from eating "salt" or "white" sage—*Eurotia lanata*. Reference is also made to a loco plant, *Astragalus* sp., with a purple bloom.—*C. D. Marsh.*

1847. Sauvageau, C., and Louis Moreau. **Sur l'alimentation du çheval par les algues marines. [Marine algae as food for horses.]** Compt. Rend. Acad. Sci. Paris **168**: 1257–1261. 1919.—Authors note that various algae have been used for forage at various times, among which were *Laminaria flexicaulis, Alaria esculenta, Rhodymenia palmata* and *Fucus serratus*. Feeding experiments using *Fucus serratus, Laminaria saccharina* and *L. flexicaulis* showed that *F. serratus* and *L. flexicaulis* make excellent forage when animals become accustomed to them, and that they appear also to assist in the assimilation of other foods.—*V. H. Young.*

1848. Seel, E., W. Deuzel, and E. Raunecker. **Über Kriegsbiere. [War beer.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **37**: 116–124. 1919.

1849. Smith, E. A. **Illustrating biological manuscripts.** Trans. Amer. Microsc. Soc. **38**: 1–19. *Pl. 1–5, fig. 1–7.* 1919.—Books on drawings are usually written for artists and journeymen, and the beginner has difficulty in finding in them the information he desires. An attempt is made in this article to give clearly such information as the beginner in science needs for making drawings, of the media used for certain classes of work, how drawings are made, and the limitations of reproduction methods. Black pictures on white backgrounds make the best reproductions. Authors are advised to study illustrations in journals and to select the styles of drawings which will best illustrate their subjects. Three methods of illustration are discussed: Intaglio; Planographic, which includes lithography, photolithography, and the photogelatin or heliotype method; and Relief, which includes the zinc-process and half-tone. Each process is discussed in detail. Under the head "Drawing for publication," the following topics are discussed: outline; shading; drawing in ink, wash, crayon and pencil; fixing pencil and crayon drawings; combinations; methods for special subjects; colored drawings and their reproduction; graphs; photographs; reduction and arrangement of drawings for reproduction. The article is fully illustrated with text figures and plates, and a table of methods and processes more commonly used for special subjects and one of standard magnifications are given.—*S. H. Essary.*

1850. Soth, Mrs. Blanche H. **The Arctic gentian.** Amer. Bot. **25**: 41. *Pl. 1.* 1919.

1851. Thatcher, R. W. **Coöperation in peat investigations.** Jour. Amer. Peat Soc. **13**: 10–12. 1920.

1852. Von Blon, J. L. **Binder twine from the desert. How a use has been found for an utterly useless plant.** Sci. Amer. **121**: 82–83, 97. *7 fig.* 1919.—Descriptive of the yucca or "Spanish bayonet."—*Chas. H. Otis.*

1853. Whetzel, H. H. **Democratic coördination of scientific effort.** Science **50**: 51–55. July, 1919.—In this paper, delivered before the joint session of the Botanical Society of America and the American Phytopathological Society of America, at Baltimore, Dec., 1918, the author makes a strong appeal for coöperation and coördination among scientific men. Progress recently made among plant pathologists is used as illustration of what can be accomplished in other fields of science.—*A. H. Chivers.*

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(References are to Entry numbers; an asterisk before a number signifies that the entry referred to is by citation alone—no abstract.)

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